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

COMPLETE IN ONE VOLUME.

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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.

[The abbreviation S. 1, in the references and elsewhere, refers to the First Supplement; S. 2, to the present Second Supplement. The references without either of these additions are to the ‘Penny Cyclopaedia’ as distinct from the two Supplements.]

A A C

AACHEN. [AIN-LE-CHAPELLE.]

ABACO. [BAHAMAS.]

ABATEMENT. Pleas in abatement for misnomer have been abolished (3 & 4 Will. IV. c. 43), and an objection thus taken to the non-jointer or misjoinder of parties is no longer of any avail in a civil action, the courts having now ample 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. 150.)

ABBEY-HOLME. [CUMBRIA.]

ABBEYLEIX. [QUEEN’S COUNTY.]

ABROTS BROMLEY. [STAFFORDSHIRE.]

ABEAKHENTAH, 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 Biafra, and about 160 miles from Abomey, the capital of Dahomey. It is in the petty kingdom of Egba, which is situated to Yorribah, 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 vast number of liberated blacks, many of them from Sierra Leone, and several missionaries, who report that their labours 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 Abeakhenkafa in one of these attempts. In June, 1850, when Captain F. 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 slave-hunting force, a great part consisting of Amazons, and met with a severe defeat under its walls, on March 3rd, 1851, which is said to have greatly crippled his power. The name of Abeakhenkafa, 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 Bassa in the interior, and a peculiar description of wool, from Quotta to the westward of Abeakhenkafa, have been introduced as articles of trade into England, and are likely to prove valuable.

ABECKET, GILBERT ABBOTT, born in Golden-square, London, in the year 1810, was the son of a respectable washer, and was educated at Westminster School. He was only displayed great talent as a humorist. As early as 1825 his dramatic productions, in prose and verse, but all burlesque character, were published in Duncombe's 'British Theatre; in 1826-29 nine more appeared in Cum-
Sorophylloicae and Lamiaceae have their sepals and petals arranged with the number five. According to a very general law, in the families of these orders, the petals are all numbered, 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 words, whereas the stamens number six, 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 Night-flying Lepidoptera, to which belongs the common Magpie Moth, A. graualirata. The caterpillar of this moth attacks the leaves of gooseberry and currant, in the beginning of the month of May. 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 escape destruction by other insects, they may be picked off, or dusted with the powder of white hellebore, or the leaves of the plants attacked may be burned.

ABROMA (from a and bromus, 'not fit for food,' in opposition to arum, 'for gods'), is a genus of plants belonging to the natural order Butterfiles. The species consist 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, seated on 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 abbr, soft), a genus of plants belonging to the papilionaceous division of the order Leguminosae. The cultivated species is *A. conicus*. The largest, legume is oblong, compressed, and 4-6-seeded. There is but one species, *A. precatorius*, which is a delicate twining shrub, with abruptly plunate leaves, bearing many pairs of leaflets. It is a native of the East Indies, but is also found in the tropical parts of Africa and America, where perhaps it has been introduced. The seeds of the commoner variety are red, with a black spot, whilst other varieties produce various coloured seeds. These seeds are in much request as ornaments among the naturalists of the continental nations. They are strong 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 fruits of *A. precatorius* are a considerable article of importation to India, and theS. stratiatum blossoms freely nearly all the year round, when turned out under a wall in Hampshire. *A. violifolium*, *A. venenatum*, *A. rubrense*, and *A. poonfororum*, are also tolerably hardy species. The plant known as Bencico de Deus, in the province of Rio Janeiro, in Brazil, is the *A. caesalipum*. It has large purple solitary axillary flowers, which are dressed and eaten with their viands by the inhabitants of Rio. In cultivation the species require a light rich loam and peat soil, and should be propagated by striking cuttings in sand in a cool greenhouse in summer.

ACCIPITER. [FALCONID.]

ACCINGTON, 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 148 miles N.W. from Leeds by the Lancashire and Yorkshire Railways. The population of the town in 1851 was 7481. The livings are perpetual curacies in the archdeaconry and diocese of Manchester. Accrington possesses two churches of the Establishment; one, St. Michael's, a plain building; the other, Christ Church, is a spacious gothic edifice erected in 1838, at an expense of about 8000£. The Wesleyan Methodists, Independents, Baptists, Roman Catholics, and Swedewor- giists have places of worship. There are national schools, besides one or two private ladies' schools. There is a subscription library, two news-rooms, and a savings bank. The town is paved, lighted with gas, and well supplied with water. The general aspect of the town is good, and the inhabitants are said to be industrious. It is a town of the ancient borough of the county of Lancashire. It is a large place, with extensive bleach works. The neighbouring coal-mines employ many of the inhabitants.

ACERAS, a genus of Orchideaceous Plants, of which one species only is known, A. acerosus, and which is found growing in Great Britain. It is a small plant, from 8 to 12 inches in height. It has a long spike spire of greenish-yellow flowers, the parts of which are so arranged as to give them the appearance of the true orchid. It is a man : hence this plant has been called the Man-Orchis.

ACETAL. [CHEMISTRY, S. 1.]

ACETONE. [CHEMISTRY, S. 1.]

ACETONITRYLE. [CHEMISTRY, S. 2.]

ACETUM. [CHEMISTRY, S. 2.]

ACHILL, an island off the west coast of the barony of Burriehooles in the county of Mayo, in Ireland. With the adjoining peninsula of Corran Achill it constitutes the parish of Achill, and one electoral division of the Poor-Law Union of Achill. It is separated from the mainland by a narrow arm of the sea, called Achill Sound, connecting Clew Bay with Blacksand 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 154 miles; breadth from Achill Beg on the south to Ridge Point in Blacksand Bay on the north, 134 miles. It lies between 53° 01' and 54° 55' N. lat., and 9° 55' and 10° 12' W. long. The area is 35,263 acres. The population of Achill is about 400 persons, many of whom are engaged in the whale fishery.

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 Blacksand Harbour; and the third side, forming a re-entrant irregular coast-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, Tonaroghaun, the cliffs towards Blacksand Bay descends precipitously from the highest point of the island, forming a shelving face of rock, of the extraordinary height of 2908 feet. Achill Head, at the extreme west, consists of a narrow ridge of rock, of about a mile in length, and from 500 to 400 feet in height, the summit of which is in some places covered with the remains of a small fort. The western side is also very precipitous: the cliff at Dooega Head, which forms the eastern boundary of Tramore Bay, rises 818 feet over the Atlantic, and is nearly perpendicular.

The geological structure of the island is simple; the whole being a series of broken rocks.

Of the entire surface of Achill Island and Corran Achill, comprising an area of 51,033 acres, and inhabited in 1841, by a population of 6392 persons, there were only 544 acres under cultivation in 1845, and in 1861 the population of the parish was only 277 vaccine. The island is inhabited by the most wretched hovels huddled together without the least regularity. In the district between Tonaroghaun and Achill Head, at Boley, some of the huts still inhabited are built of drystone in the beeive form. There are three considerable villages: one at Barm, on the south-west, where there is a good boat.
produce. Orchards and vineyards are numerous; lucerne is sown to a great extent for fattening cattle and for their maintenance during the winter. In summer cattle find excellent pastures on the declivities of the mountains which however during four or five months are covered with snow. Hemp is also cultivated in some parts of the valleys. Great quantities of apples, pears, peaches, nectarines, figs, walnuts, muscatel grapes and strawberries are sent to Santiago and Valparaiso. The sugar-cane is cultivated in the valley of La Ligua, but no sugar is made, the green shoots being taken to Santiago for sale.

The hills and mountains which incline the valleys and cover by far the greater portion of the surface of the country are stony, mostly round-topped, and of gentle slope, except towards the Andes where they are steep. Their soil consists of a hard red clay, which is thinly covered with a few bushes and stunted trees, and many cactuses. The ravines present a few evergreen trees and shrubs. The nature of the soil and the scarcity of rain combine to render these hills nearly useless as pasture ground. In some places however near the coast there are some more fertile tracts, on which herds are raised without much difficulty. They may be planted in a mixture of loam and leaf-mould, with a little silver sand. They can be placed out in the summer, but require shading on hot days.

ACHYLA — A genus of Cryptogamous Plants, belonging to the class Bogaceae. It is composed of a single tuberous cell, 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 matter has been observed. In course of time cells are formed in this enlarged cell, and the outer cell eventually bursts at some spot, and allows of the escape of the enclosed cell; but before this places the cells in the interior move about, and, after their escape, exhibit for a considerable time the usual suberous plants. Some examples of the Zoospores. They soon attach themselves to some fitting object, and grow into little plants, like their parent. A similar process goes on in most of the Algae, but not so easily observed as in this case. The class which has been described is the S. protonemata, which is found parasitic upon fish and other aquatic animals. This plant is more especially developed on fish and aquatic reptiles kept in confinement. It was first observed on gold fish, but several writers have described it as existing on various animals, as the Stickleback, Water Shad, Salmon, Frog, and Newt.

ACID, ORGANIC. [CHEMISTRY, S. 2.]

ACONCAGUA, a province of Chili, in South America, lying on the coast of the Pacific ocean, between 32° 30′ S. lat. and 79° W. long. It is divided into 11 departments and 333° 30′ S. lat., 71° and 72° W. long. Its length from N. to S. is about 150 miles; towards the east the province extends to the crest of the Andes, between which and the Pacific the width is about 100 miles. The province is divided into the departments of Maule, Cauca, Cule, and Linares, which may be separated by the heavy swell which sets in from the south-west. The port of Quintero formerly had from one and a half to two fathoms water, but by the earthquake of 1822 its bottom was raised, with the adjacent coast, from four to five feet, so that it is now too shallow for vessels of any size. North of Quintero are the road-heads of Horcon and Papudo, with good landing places; and farther north the cove of Piano, from which much copper is shipped. The principal towns of the province, like most of those in Chili, are regularly built and on a uniform plan; so much so that a general description of one will suffice for all. In the centre is the Plaza or principal square, one side of which is formed by the cathedral or church and the buildings connected therewith; a second side is formed by the military or municipal offices; on the other sides, which in most instances are fronted with piazzas, are the theatre, coffee-houses, and the principal shops. The area of the Plaza serves frequently during the early part of the day as a fruit market, and vegetable market in the evening. It is the residence of promenade; and during all political and religious festivals it is the great centre of attraction. From the Plaza branch off the principal streets, straight, wide, regular, and crossed by others at right angles. The houses, as is usual in countries subject to earthquakes, are only one story high; they are built of sun-dried bricks, and in the Spanish fashion. Towards the street they present generally a blank wall, pierced only by a wide doorway or gate leading into a patio, or court-yard, on which the prin-
ADDISON'S DISEASE: 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 or, &c.]) The customs of London, York, &c., 1280, are acknowledged, and the distribution of the estates of intestates thus rendered uniform throughout England. (19 & 20 Vict. c. 94; &c.)

ADMIRALTY, COURT OF. The jurisdiction of this Court extends to the recovery of a ship, &c., where the removal of the maritime jurisdiction by the statute 9 & 10 Vict. c. 90. Questions relating to the attack and capture of pirates may now also be determined by this Court or the Vice Admiralty Courts abroad. (13 & 14 Vict. c. 122.)

ADOLPHUS, JOHN, was born in 1770 and died July 14, 1855. 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 his conviction. 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 just a few weeks after his death, 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 the 'Statute Law of the British Dominions in the West Indies;' 'Political State of the British Empire,' 4 vols. 1818; 'Memoirs of John Bannister;' and some fugitive pieces and pamphlets.

ADULTERY. The action of damages for criminal conversation in the case of a woman, was once an established cause in the common law, but has now, under 21 Vict. c. 85, 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, as a provision for the maintenance of the wife. [DIVORCE, &c.; SEPARATION, JUDICIAL, &c.; HUSBAND AND WIFE, &c.]

ADZEMA, TADPLACE, is common throughout the whole of Europe, and grows abundantly in Great Britain. It has a stem, with leaves, having a long stalk, and three times ternate; the leaves unequal at the base and 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.

ÆTHERS, SILICIC. [CHEMISTRY, &c.]

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

AFFRE, DENIS AUGUSTE, archbishop of Paris, was born in 1805. At an early age he evinced a desire to devote himself to the Church, and he became a student at the seminary of St.-Silpice. He was ordained priest in 1818, and discharged a variety of ecclesiastical functions till he became archbishop of Paris in 1840. Although in less of study and learning, and the author of several treatises (amongst which was one on Egyptian herioglyphics), he would scarcely have found a place in the history of his times, but for the lamentable circumstance of his death on the 27th June, 1848. Paris was then in a condition of fear, either between the solider and 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 solildry having ceased at his desire, the archbishop mounted a barricade erected at the entrance of the Faubourg St.-Germain, which he held for a short time, in the dress of a national guard, 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 man, having been received with the confidence that he expected to inspire. Some indeed of the combatants sternly rushed out their hands, but others remained silent, while others groaned and hooted. The prelate endeavored to speak a few words; but the insurgents, fancying themselves betrayed, threw a stone at Gardes Mobiles, who then fired an volley. He fell. Then a cry of horror went up from the crowd, and many, even of the insurgents, rushed to his aid. Albert and Sellier were leading him away, when Sellier was also struck by a ball. The insurgents who surrounded the archbishop rushed out through the barricade to the house of the Mahaut, 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 its 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. (Nuova Biographie Universelle, 1852.)

AFREIDIES, NED, was spoken of under the more general name of Kyburees, inhabit the Kyber hills on the confines of Cabul and the Punjab. They command the passes in these hills, for a safe conduct through which their Malikus, or chiefs, consider themselves entitled to the fee of fifteen cents for each man, and of twenty-five for each欧洲人, which was 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 Afreidies against the British in Cabul. They repaired the march of Colonel Wade and the Sikh auxiliary through the hills of Cabul in July, 1839, but were compelled to evacuate the fort, Ali-Musjid, the key of the pass, which, with other posts between Peshawur and Jelilasabad, was garrisoned by small detached parties. At the conclusion of the Afghan campaign in 1849, they defeated two Sepoy regiments advancing under Brigadier Wild from Peshawur to the relief of two other Sepoy regiments under Colonel Mosesley 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, Mosesley evacuated the fort on the 24th, which was immediately seized by the Afreidies. On General Pollock's advance from Peshawur to the relief of Jelilasabad, in the spring of 1849, the Afreidies were expelled from the Cabul valley, and their capital was declared to be Daka 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 and took the hard climb up the mountains across the entrance. Before Pollock reached Ali-Musjid the Afreidies had evacuated it; it was 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 Afreidies in connection with another pass on the road from Peshawur to Kohat, leading to the Salt Range. On February 2, 1850, about 1000 Afreidies plundered the camp of a party of British Sappers employed in making a road through this pass, about 16 miles south from Peshawur, and killed several of the men. To avenge this massacre a strong force, under Colonel Bradshaw, scoured 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 ranges.

To the west of the Kyber hills, on the Cabul side, the Momund clan dwells along the banks of the Cabul River. Their chief place, Laipoorah, the residence of the Malik, is opposite Daka

AFRICA. At the period when the article Arance in the 'Penny Cyclopedia' was written, the descent of the Quorra, or Niger, 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 countries through which it flows, and its extent, brought down to the year 1840. At that time an expedition was in preparation by the British government, the object of which was to chart 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 store-vessels, began the ascent of the river in 1841,
but a fatal sickness unhappily seized the greater part of
the crew and officers, and they were unable to ascend the
river so far as it had been previously reached by the disastrous
expedition of 1832. The failure of these two expeditions,
attended as they both were by a fearful loss of life, pre-
vented any renewal of the attempts to ascend the Quorra
till the year 1854, when Dr. Bakie made his successful
ascent of the river and its great eastern tributary, the
Tchadda or Benue. This ascent was made in Mr. McGregor's
launch, the Plied, fitted up and provided with a par-
allel construction suitable for ascending a shallow river against
a powerful current. In the first instance Lieutenant Lyons
McLeod, R.N., was to have had the command, his project of
exploring the Niger between the Tchadda and the Gambates
having been abandoned; but afterwards Mr. Befcroft, already
well acquainted with the Quorra, was appointed the chief.
Mr. Befcroft, however, died before the Plied had reached the
mouth of the river, and the command was then assumed by
Dr. Bakie, surgeon, R.N. The expedition occupied about
four months, from July 12 to November 7, and ascended
250 miles of the course of the Tchadda above Dagbe, which
was the farthest point reached by Allen and Oldfield
in 1832, and is about 100 miles from the confluence of the Tchadda and the Tchad. This point, reached by Dr. Bakie's
expedition, was only fifty-five miles from the place where Dr. Barth
afterwards crossed the Benue, thus proving that the Benue of Central Africa is the same river as the Tchadda. Dr. Bakie
is (I believe) engaged in another similar expedition,
in which he hopes to reach the Tchad itself, though possibly
a still higher point. He had ascended the Quorra to some distance
above Rabbu, where his steamer was wrecked by striking
on a sunken rock in the bed of the river. All the persons,
having been saved, and they had entered into friendly
relations with the natives. A new steam-vehicle, suitable for navigating the Tchadda, has been sent out to
replace the one which has been lost.

We now proceed to notice the discoveries made in the south-eastern part of the continent since the publication of the article Aruaca, in the 'Penny Cyclopedia.'

In the years 1835 and 1836 Dr. Andrew Smith made a
journey in South Africa, during which he visited the sources
of the rivers Caledo, and Maputa, ascended the mount-
tains of Caffraria, and advanced in the tracks of the traders as far north as the Tropic of Capricorn. He was
unsuccessful, however, in the principal object of his journey, which was to find a passage between the Niger and Nyasumi, since discovered by Messrs. Livingstone, Oswell, and
Murray. In 1836 and 1837 Captain J. E. Alexander ex-
cplored the countries inhabited by the Namaquas, Bushmen, (Boesemans), and Hill Damaras, extending on the western side of the Cape Colony to 58° S. lat., near the river Nourse on the north, and as far inland as 21° E. long. Through this journey we obtain a description of the Damara people, who, though a race of fine
 stature, are in a low moral state, and likely to be extin-
cuted by the more civilized and advanced tribes of the central
neighbours on the north, the Ovampo. The high table-land,
which was traversed to reach the Ovampo, is cut through by
deepest ravines, the chief of which serve as escapes for the
periodical floods of the rivers. In delineating the moral
character, as well as the physical conformation of the
different tribes of South Africa, it is interesting to observe,
from the observations of Mr. Galton, how their differences
are connected with the form, subsoil, and vegetation of their
respective lands. Thus, the arid inland plateau, covered
only with thick jungle and short brushwood, hold the dwarfed
and sinewy Bushmen; the more open, hilly, and undulating
pastera-lands, the Damaras; whilst the rich corn-lands on the
north are occupied by the race which is the most cultured
and advanced, the Ovampo and Ondongas, the capital of this
people, is estimated to be about 70 or 80 miles to the south
of the great river Amorongho Achilulas, the Nourse of our
maps. The table-land inhabited by the Damaras rises in the points to 5000 and 6000 feet, and at the time
Mr. Galton was there, in September and October, 1851, pro-
ceded as far eastward as Tounious, a distance of 600 miles
from the coast, on the road to Lake Ngami, distant about 180 miles. Mr. Galton did not reach Lake Ngami, having
expected it to be at least 70 miles nearer, but when he arrived at a place which he supposed to be Lake Ngami, which
was expected, and the specified time not allowing him to
remain longer. Mr. Anderson however afterwards
proceeded again to Tounious, and thence to Lake Ngami,
from which he ascended a distance, and the river Teouguie, the
principal affluent of Lake Ngami. Mr. Anderson also
reached the Lake at the end of July, 1853. Mr. Galton and Mr.
was estimated at a little over 20000 feet, and they had
described it in their travels to 11 from Kolobeng.
The latitude of the upper end of the lake is 20° 20' S., and the longitude probably between 23° and 23° E.
The lake receives the Teouguie, a large river, at the north-
western end, and discharges itself by the Zouga at the north-eastern end. Lake Ngami is about 70 miles
from the Teouguie, which, as well as the Teouguie, flows
from the north. The Zouga continues for a consider-
able distance to be a fine river, broad and deep, with
beautifully wooded banks, but receiving no more affluent,
and therefore having lost the richness of its channel, as its
distance from Lake Ngami becomes very low, and the rivers
are dried up. The water begins to flow again in April, but
makes little progress in filling Lake Kudumulu till the end of
June. The Batswana tribe of natives live at the eastern end
of the lake, where they have their principal village. After
a short stay there, the party returned, and arrived at Kolobeng,
October 10. There are prodigious numbers of the
elephant, rhinoceros, and other large animals, in the vicinity
of the lake and its rivers. The name Ngami is pronounced
by the natives at the end of some name. Mr. Galton
made another short visit to Lake Ngami in 1850, accompanied
by his wife and three children.

In June, 1851, Dr. Livingstone, accompanied by Mr.
Oswell, again started for the north. The two parties
separated, and they succeeded in pushing their researches northward to 17° 25' S. lat., and between 24° 30' and 26° 50' E. long., traversing a consider-
able tract watered by deep and constantly flowing streams.
They passed over a large salt incrustation of about 100
miles in length and 15 miles in width, and saw many others
lying to the north of the spot where the Zouga terminates.
Considerably to the north of these great natural salt-pans,
and not far from the river Nyasumi, the Zambesi, the inhabitants are more intelligent than most of
the native tribes of South Africa.
Anderson have each published a volume giving an account of their travels.

We shall now give an account of the missionary explorations from the eastern coast, and of the expedition to Central Africa.

The zealous and enterprising missionaries, Kräpf and Rehbmann, stationed at Rabbai 'Mpija, near Mombasa, in about 4° 5.30' S. lat., began their journey into the interior of the country in November, 1847. That year Mr. Rehbmann penetrated westward to Teita, a "country whose mountains rise to such a height out of the vast surrounding plains, that on some eminences near Rababi 'Mpija they are to be seen at a distance of 5 or 6 miles, and with the glass mounted on a gun, the same missionary performed a journey farther into the interior, to the still more elevated country of Djagga, where, at a distance of rather more than 200 geographical miles from the coast, in a direction about W. 30° W. from Mombasa, he made the remarkable discovery of a lofty mountain, named Kilimanjaro, of which the summit is covered with perpetual snow. The existence of snow on Kilimanjaro has been disputed in Europe, though it is difficult to say on what reasonable ground. On subsequent journeys, both Mr. Rehbmann and his colleague Dr. Kräpf 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, both with the object of gaining further indications of the existence of the unknown mountain, and December of the same year Dr. Kräpf successfully penetrated as far as Ukambani, a country situated northward of Djagga. Of the geographical results of this journey, one of the most important is the discovery of another snowy mountain, named Kilima-njaro. The mountain was discovered to the south for the first time by the Reverend Mr. Rehbmann's map ("Church Missionary Intelligencer") is published in 1° 8. lat., 25° 10' E. long., at a distance of 320 geographical miles north and 65 west from Mombasa. This position, observed to two immense towers, one of which, as you may call them. These horns or towers, which is a short distance from each other, give the mountain a grand and majestic appearance, which raised in my mind overwhelming feelings. Kilimanjaro in Djagga has a dome-like summit; but the mountains of the former are formed of 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 Kefina issues to the north runs towards the basin or, on a subsequent journey, both Mr. Rehbmann and his colleague Dr. Kräpf satisfied themselves of the fact; and unless it be intended absolutely to impugn their veracity, their evidence cannot be rejected.

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 to Ghat is the great number of fresh discoveries were made in this journey, but some further information was collected respecting the river which flows from the Kefina (Ndukenia or Kireina) 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, induced the English government to send him out for 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 expedition, and afforded the two travellers pecuniary assistance, in addition to the money sent by the Geographical Society in Berlin this 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 year 1850. They journeyed throughout the mountainous region to the south was thoroughly explored and surveyed by the two Germans with 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 50° Fahrenheit, and on the 2nd and 3rd of February, the snow obliged the travellers to remain in their tents. After their return to Tripoli, several weeks 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 camels were requisite to convey it across the burning sands of the Sahara.

The travellers started at last on the 24th of March, 1860, the great caravan having departed before them; but the party formed a small caravan of itself, having about 40 camels and mules. The required assistance was rendered by her Majesty's consuls in Tripoli and Murzuk to the undertaking, so that the expedition started under the most favourable circumstances.

The direction of this town, Murzuk was almost due south from Tripoli, beyond the Obarian defile, the country consisting of a continuous table-land, of an average elevation of 2000 feet. As far as the well of Taboniyah, many deep wadies intersect this table-land, and the ruins 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 vegetation can be seen; and the BOXU of Dot-ḷ in which occurs is only found scattered in the trifling irregularities of the surface. The ground is covered with small stones, pyramids of which, erected with great labour, serve as roadmarks to the intrepid camel-drivers by day, while the polar movements of the sun are indicated. On the 8th of July, after six days the expedition reached the southern edge of this table-land, which descends in perpendicular walls to the Wadi el Helai. Following the descent for about 60 geographical miles, the travellers came to the Wadi Shabiti, 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 contrast with the light relief of the basaltic rocks. They reached Murzuk on the 8th 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, but happily none of the party suffered during their stay.

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forms. From Ghát the general surface of the country
continues to rise, and at Seluñet the travellers saw
around them masses of mountains, and their journey
began to be more adventurous. 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 fog. Frequent thunder-storms and heavy rains also
occurred, which caused the banks of the rivers and
the wādīs became completely changed, luxuriant plant-
ations of palms being everywhere met with to the south of
Taghajjīt. According to the natives the rainy season lasts
until the 30th of September. At Soodan the so-called
rain season is called the sogh and dagg; the former,
when the rains come in May and June, is mild and
placid, and the latter, from the beginning of July until
the 22nd of July, is violent and destructive.

On the 11th of September, 1851, Dr. Barth set out on
an expedition to Kānem, a district on the eastern side of Lake
Tchad. On the 18th of September Dr. Overweg joined Dr.
Barth, and after a short halt at Kukā, on his return from
the Shāry, they arrived at Lake Tchad on the 22nd of September.

On this expedition Dr. Barth had a favourable opportu-
nity of investigating Lake Tchad. It is a vast lagoon without
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The rains had then commenced, and the river was over 1000 yards wide, very deep, and flowing at a rate of about three miles an hour. He crossed the Logon or Linyanti at the 15th 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, 3 vols. Lon., 1835. Mr. Overweg, who came to Timbuctoo in August from the north, recovered and proceeded to Mechoula, and thence to Timbuctoo, which he reached October 12, 1840. 

In February, 1853, Dr. Edward Vogel, a young German, employed at Mr. Bishop’s Observatory, Regent’s Park, Lon., was sent to join Drs. Barth and Overweg. He was accompanied by two volunteers from the corps of Sappers and Miners. They reached Lake Tchad on the 6th of January, 1854, and were received kindly by the sheikh and his uncle. Dr. Barth was then absent on his journey to Timbuctoo. Dr. Vogel was 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 recent troubles. It is hoped that the stories of his explorations, had visited Yacoba, and on the 3rd of April, 1855, had crossed the Tchadda at the place where Dr. Bisatie had been, in the Pielied steamer, in 1854.

In January, 1855, accounts were received by the Royal Geographical Society that the Linyanti, which were subsequently confirmed in April, of the successful issue of a commercial journey across the continent of Africa by a Moorish caravan, basing for ivory and slaves. It had started from Zanzibar on the east coast (6th S. lat., 26° 8’ long), and had reached the Benega on the west (12th S. lat., 15° 5’ E. long). The journey occupied six months; a day and a night were occupied in crossing the great lake of Tanganyia, also called Zambesi, Zewa, and Maravi. In one part of the journey no elephants could be found.

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 of a connection with the West Coast of India. When he reached Kuruman, on his return, he learnt by a letter from the chief Sechelle that the natives had been attacked at Kolobeng by the Boers of the Casan Mountains; that the village of Kolobeng had been burnt, and that the cattle had been destroyed. The 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 Bakwaine, he proceeded northwards on the 15th of January, 1853. The Bamangawo Hills, between Kolobeng and Lake Ngami, are part of a range called Bakasi, which rises about 700 or 800 feet above the plains, and is composed of great masses of black basalt. This mass of basalt, about six miles long, is tilted up towards the rocks both on the east and west. Passing on to Letchofo, about 20 miles beyond the Bamangawo, they found a fine supply of water. This spot was Mr. Gordon Cumming’s former station north. Farther on they came to the hill Nyasa, 15° 27’ 30” S. lat., 24° 13’ 26” E. long. It is 300 or 400 feet high, and was the only hill they had seen since leaving the Bamangawo Hills. As they approached Linyanti, they found the river-beds filled by the annual inundation, and flushed with the overflow from the Linyanti, with the rise of the Leembe. With some difficulty they reached Linyanti, May 23, 1853. Linyanti is the capital town of the Matabele, and is situated in 18° 17’ 20” S. lat., 23° 50’ 9” E. long.

The chief of the Makololo, named Sekeletu, a young man of 25 years of age, and head of the nation of Matabele, numbering 7000 or 9000, received Dr. Livingstone, whom they were expecting, with enthusiastic welcome. The Makololo are the most northerly of the Bantuans.

Having waited a month at Linyanti, Dr. Livingstone, attended by a party of the natives, set out from Shesheke,
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 Dollond, and a compass from the Cape Observatory, and a small telescope.

On the 11th of November, 1833, he left the town of Linyanti, accompanied by Sekeleku and his principal men, to embark on the Chobe. They crossed five branches. With this branch they entered the deep river. The banks are of soft calcareous tufa, like those of the Zonga. The bed is deep, and the sides perpendicular. The course is extremely tortuous.

The ascent of the confluence of the Chobe with the Leembybe is ill defined, 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 thorny south. Turning round they began to ascend the Leembybe, and on the 19th of November reached the village of Shesheke. After a short stay they proceeded up the Leembybe. Their progress was slow, owing to their waiting at the different villages for food.

Dr. Livingston having once been on the way 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, bordered by woods, and the water flows rapidly over the rocky bottom. It requires great skill and 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 bordered with woods. The capital 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 Leeba and Leembybe, 14° 10' 52" S. lat., 23° 35' 40" E. long., and the confluence of the Leembybe with the Leembybe tunya 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 the river at London Bridge, and perhaps a little deeper. There are, however, many and serious obstacles 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 Simah, where a Thames steamer could ply at all times of the year; but, again, the space between Simah and Katima-Molelo has five or six rapids, with cataracts, one of which, Gonye, could not be passed. At this point the water increases rapidly, and there are reaches of quiet and deep water of several miles in length. 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.

On the 3rd of January, 1834, they crossed the Leeba and the Leembybe. The water is black in colour as compared with the Leembybe, which here assumes the name of Kabombo. The Leeba 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, a large pond, or else a gentle riffle 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 continuous, and the travellers were quite drenched.

When they had ascended somewhat more than one-third of the Leeba, 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 Leeba, 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. Livingston, being exhausted by the journey, could not walk or ride the whole day. After passing a little farther to the N.W., they came to river, which flowed northwards into the fine river Kasai, or Loké, which has a northern course, while all the rivers they had previously passed flowed southwards; thus showing that the flow of the Lake Leembybe is from an elevation on the north flat which forms the water-parting 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 (from which name), which is the farthest station known 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, 15° 12' S. lat., 15° 30' E. long., and on the 31st of 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 churches, one of which, formerly used for 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. Livingston. The harbour is formed by a low sandy island, between which and the mainland is the stile 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. Livingston with great kindness and hospitality.

On the 22nd, September, 1834, Dr. Livingston and his party of Makololo departed from Loanda on their return to Linyanti. They passed round to the mouth of the river Bengo, and ascending that river, arrived at Ileilo i Bengo, and on the 28th of September at Kalungwemo, on the same day they crossed the river Luapula, which flows from coffee, and sugar is also cultivated. Dr. Livingston 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 point where it receives the Lucalla. Massangano lies on a tongue of rather high land formed by the left bank of the Lucalla and right bank of the Coanza. It has more than 1000 inhabitants. The latitude is 9° 37' 46" S. The fort is small, but in good repair. The land on the north side is well cultivated by a Quissana Kishone, an independent tribe whom the Portuguese have not been able to subdue. Returning to Golo Alto he found several of his men ill of fever.

On the 14th of December, Dr. Livingston and his men, having recovered from severe attacks of fever, proceeded to Ambaca, 9° 16' 32" S. lat., 15° 22' E. long. On crossing the Lucalla they made a detour to the south in order to visit the famous rocks of Pungo Adongo, the fort which stands 9° 45' 14" S. lat., 16° 30' E. long. It is situated in the midst of a group of curiously angular-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 brown sandstone, with very few trees. On the 3rd of January they crossed the Cambambe, to the east of which the navigation of the Coanza reaches, is reported to be thirty leagues below Pungo Adongo.

On the 1st of January, 1835, they started from Pungo Adongo in a prairie along the right bank of the Coanza. On reaching the confluence of the Lombe, they left the river, and proceeded in a north-easterly direction. Passing over the heights of Talama Mengongo, 9° 42' 37" S. lat., 17° 27' E. long. (Jan. 16), 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 declivity which bounds the Cassange valley, and found it to be 6000 feet above the level of the sea, the bottom of which is at least 2000 feet below the Coanza. It is a deep but narrow stream, by a bridge. It is the boundary of Londa on the west. On the 20th 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 Lomiau, where they had to cross the river.

On the 7th of May they arrived at the Moamba, a stream 30 yards wide, which they crossed by canoes, and arrived at Cabango, a village on the banks of the Chihombo, in 9° 31' S. lat., 20° 51' E. long.

On the 30th of May they left Cabango, and on the 28th reached the village of the chief Bango, 12° 29' 55" S. lat., 20° 58' E. long. On the 30th of May they left the village of Bango, and proceeded to the river Loembe, which they crossed February 1836. Having passed the Loembe, they reached (June 2) the village of Kawawa, who wished to detain them, but borrowing one of his hidden canoes by night, they crossed to the southern bank of the river Kaali.
After leaving the Kasi, they entered upon the extensive level plains which they had formerly followed. On the ist of June they forced the Lotemba, there about a mile wide, and deep, and regained their former path. It is a N.W. of Lake Dilolo, and seems to flow from it northwards, and enter the Kasi, whilst another river Lotemba flows from the other end of the lake southwards. Thus, this little branch joins the large one, and the other becomes tributary to the Kasi, and another to the Zambezi, distributes 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 is known thus far as the Linyanti, one, with men well acquainted with the rapids, by passing down the left bank, and coming into one of the stream in the eddies and still places caused by many jutting rocks, brought him to an island situated in the middle of the river, and on the edge of the lip over which the water falls. The water was low. If it had been high, it would have been impossible to have reached the island without being precipitated down the Falls. But though they had reached the island, and were within a few yards of the edge of the Falls, one could perceive what the last body of water went; it seemed to have lost itself in the earth, opposite lip of the fissure into which it disappeared being only 80 feet distant. Dr. Livingston could not comprehend it, until, creeping with awe to the verge, he peered down into a large rent which had formed in the bank of the river, and saw that a stream of 1000 yards breadth leaped down 100 feet, and then became suddenly compressed into a space of 15 or 20 yards. The entire falls are simply a crack made in a hard basaltic rock from the right to the left bank of the Zambezi, with a din like that of leaves being rubbed together, which is heard miles of miles. In looking down into the fissure on the right of the island, nothing is seen but a dense white cloud, which at the time had two bright rainbows on it. From this cloud rushed up a great torrent of vapour exactly like steam, which mounted 200 or 300 feet high. There condensed, it changed its hue to that of dark smoke, and came back in a constant shower, which soon wetted them to the skin. On the left of the island the water is seen at the bottom, a white rolling mass moving in the narrow fissure, and the branches off near the left bank of the river. The walls of this gigantic crack are perpendicular, and composed of one homogeneous mass of rock. The edge over which the water falls is partly worn and broken, so as to have a serrated appearance. The other edge is more like a cliff, except at the left corner, where a rent appears. The rock is dark brown in colour. The columns of vapour are evidently formed by the compression suffered by the force of the water's own fall into the narrow space. The upper part of the falls, which were on the right side of the island, and two on the left, and these were larger than the central column. It was low water in the Leembe, but there was a flow of 500 or 600 yards of water, which at the edge of the falls seemed at least 3 feet deep. Further down the span of the river was much deeper. Dr. Livingston could not obtain an observation of the moon to determine the position of the Falls, but that of Kalai, about 10 miles N.W. from the Falls, is 17° 51' 54' S. lat., 25° 41' E. long.

Sekelita and his large party having conveyed Dr. Livingston thus far, and furnished him with 114 men to carry the elephants' tusks to the coast, on the 20th of November, 1855, he bade adieu to the Makololo, and proceeded northwards to the river Lekone. Both the Lekone and the Leembe flow towards the centre of the country; so that it was obvious that they were then ascending the farther they went eastward. The country around was very beautiful, and was once well peopled with the tribes called Botoko, who possessed large herds of cattle. There is abundant evidence that a vast freshwater lake once existed in this part of Africa, extending from about 17° to 21° S. lat., and 22° to 26° E. long. The Borotse valley was another similar lake. These lakes were let out by means of cracks or fissures made in the subjacent mass of the country. The fissure made at the Victoria Falls let out the water of this great valley, and left a small patch in what was probably its deepest part, and is now called Lake Ngami. The Falls of Gouve furnish an outlet to the lake of the Gorongosa valley, and so of the other great lakes of the remote times. The party travelled in a direction E.N.E., leaving the Zambezi a considerable distance to the south. From the 5th of November to the 18th of December, they crossed several rivers flowing southwards into the Zambezi, and

covered with trees. The tops of the columns at that distance appeared mingled with the clouds. They were white below, and higher up became dark, so as to resemble smoke very much. The banks and also the islands scattered over the river were adorned with abundance of trees and other vegetation of various kind of form and colour. No one can imagine the beauty of the scene from anything witnessed in England. The only want felt is that of a look back in the beautiful country they had already crossed. Instead of lofty snow-clad mountains appearing to conjure the speculatives, there were extensive plains, over which a person might travel a month without seeing anything higher than an ant-hill or a.
passed on their route numerous villages inhabited by the Batoks. On the 18th of December they reached the bank of the Kafue, a river upwards of 200 yards wide, and full of hippopotami; there they encamped for the night. Their camp was four miles to the east of the Kafue. It was a very considerable distance above the Victoria Falls. There were vast numbers of water-fowl.

January 14th, 1856. The party reached the confluence of the Kafue with the Zambesi. They were met by the remnant of a church, with a broken bell, having the letters I.H.S. and a cross, but no date. The church stands in 16° 37' 22" S. lat., 30° 32' E. long. This was at Zumbo, which is situated in the angle of the confluence of the two rivers, and was formerly a considerable place, and only 32 miles north of the Zambesi. From this point the merchants had water communication in three directions beyond, namely from the Loangwa to the N.N.W., by the Kafue to the W., and by the Zambesi to the S.W. Their attention, however, was chiefly attracted to the north, or Lunda, and the principal articles of trade were ivory and slaves. It was a Portuguese colony, and, like the rest, military. The Zambesi is very broad here, about 1300 yards, and contains many inhabited islands.

January 24th they crossed the Loangwa in a canoe, and on the 24th of January passed in canoes from the north bank of the Zambesi to the south. They then proceeded at some considerable distance from the bank of the river.

On the 29th they arrived at the Portuguese settlement at Tetè (16° 9' 3" S. lat., 33° 28' E. long.), and were very kindly treated and received by the commandant. The village of Tetè is built on the south side of the Zambesi, on a long slope down to the river, the fort being close to the water. The roof is thatched with grass. The rock, on the top of the slope are much higher than the fort, and of course command it. The whole of the adjacent country is rocky and broken, but every available spot is under cultivation. The stone houses are cemented with mud instead of lime, and thatched with grass. In the neighborhood there are about 30 or 50 stone houses; the rest are native, and of wattle and daub. The population is about 4500. Only a small proportion of these live on the spot, the majority being engaged in agricultural operations in the adjacent country. Generally there are not more than 2000 resident; for, compared with what it was, Tetè is now a ruin. The fort of Tetè has been the salvation of the Portuguese power in this quarter. It is a square building.

On the 22nd of March they left Tetè, and sailing down the river, arrived at Senna on the 27th (17° 27' 1" S. lat., 30° 10' E. long.). It was found to be 523 hours sail from Tetè. Dr. Livingstone thought the state of Tetè quite lamentable, but that of Senna was much worse. The fort, built of sun-dried bricks, was in a wretched state. The village of Senna stands on the right bank of the Zambesi.

The Zambesi at Mazaro, where the delta begins, is a magnificent river, more than half a mile wide, and without islands. The delta is an immense flat, covered with high coarse grass and reeds.

Sailing down the branch of the river on which Kilimanjo 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. Kilimanjo is in 17° 65' 58" 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 Frolic arrived off Kilimanjo, and took him on board. There is a dangerous bar at the mouth of the Kilimanjo branch.

Dr. Livingstone left Kilimanjo, July 12, 1856, and arrived at Mauritius, August 12. He returned by the Red Sea and the Suez Canal, 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 Sixteen 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," 5vo. 1857.

Dr. Livingstone is at present (Jan. 1858) in London, making arrangements for a new voyage to 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 is also the recipient of a grant of £1000. A suitable steam- vessel has been prepared for him, and he will be accompanied by three or four scientific gentlemen, who will assist him in his well-intentioned labours.

In 1854, Lieutenent Burton of the army of the East India Company, who had been pursuing the Wandering Africans through his hazardous journeys 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 sea, it 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 sovereign, Harar has the rude emporium of a considerable traffic in choice products, more particularly coffee. [Harar, S. 2.] Lieut. Burton has since undertaken a journey from the eastern coast of Africa in the direction of the Lake Nyassa, yet unvisited by Europeans, and may possibly pass through the treasures of the tea and coffee region. This is a question which has excited the curiosity of the learned world from the time of Herodotus to the present day.

AGADEZ, or, as the Tuaregs call it, Ethan, is a town of 15,000 inhabitants, in the province of the Niger, to the north of Hamadah, or high plain, consisting of sandstone. It is the capital of the kingdom of Air or Asien, 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. Agades is situated on a great plain, once a flourishing town. Agades from its situation, must always have formed an important central place between the Kelowis and the tribes inhabiting the districts to the south and west. There are traditions among the inhabitants of that this town was the capital of the kingdom of Air before the ancient time, 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 Timbuctu.

Agades formerly contained not less than from 50,000 to 60,000 inhabitants. Dr. Barth was assured by the Turvati, one of whom had been at Timbuctu seven times, that it was much larger than that place. At present the appearance of the town is very different. It has lost almost three fourths of its population. The present number of inhabitants is estimated to be from 7000 to 8000, who are partly merchants and partly artisans. They have a weekly market, and their trade extends as far as from the northern markets of Ouat or Murunk, unless a journey to Mecca.

There exists no intercourse with Timbuctu. The commerce of Agades itself is principally in millet, which constitutes the principal food of the inhabitants. The manufactures are very limited, consisting of leather-work and mats. The saddles made in Agades, particularly those used in riding upon the meheris, or swift camels, and also the sandals, are far famed. Respectless of the degree of civilisation of the inhabitants, it may be mentioned that there are five or six schools in Agades, where the boys are taught to read the Koran, and to write. The women seem to enjoy great freedom. Some of them are pretty, and have Arab features; and among the men Dr. Barth beheld some fine faces. The population is so mixed that it would be difficult to make out the type of the original stock.

The houses are generally spacious, built of clay, and a few are quadrangular. They are all being formed by planks of the doom palm covered with mats, over which earth is thrown. Agades has a tower, which is from 90 to 95 feet high. For such a place, situated in the midst of warlike hordes, a tower is of the greatest importance.
water near the town, and there is also plenty of brushwood.

AGDE. (HERAULT.)

AGNES, ST. [CORNWALL.]

AGRICULTURAL IMPLEMENTS. Few of the productive arts have made so much rapid progress within the last few years than those relating to the cultivation of the soil. In the time of Mr. Fisher Hobbs, we find attentions to this art. A great deal 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.

We have already referred to their report on the Agricultural 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 operations, such as Instruments 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 these were the very best ploughs that nature would permit, they were not always in use because of the nature of the land; but they were not suitable for an altered state of agriculture, when the heavy lands were laid down for grazing, and the downs became corn-lands. Even when the swing-plough was invented as an improvement on the old wheel and galloway plough, the weight of draught was little less than before. It was the Messrs. Ramsone of Ipswich who furnished the model on which the manufacturers worked; boards adapted to different sorts. Messrs. Howard and Mr. Besby afterwards paid particular attention to the curvatures of the mould-board; for this is indeed the essential acting part of a plough; raising, turning-out, and throwing over every furrow—a slice 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 for raising 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 foreign countries. Among the ploughs exhibited at Hyde Park, eighty-four were out to trial at Mr. Pusey's estate in Wiltshire, by Mr. Miles, Mr. Shelley, and Mr. Owhaite; while eleven others were tried at Mr. Mechel's farm in Essex, by Baron Menten's D'Osten, Colonel Chalmer, and Mr. Johnson. Of the former group, nine were two-wheel, three three-wheel, and six swing-ploughs. Some were found best at a seven-inch furrow; some broke too much at the furrow of a thatch.

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 no mathematics even in farming. The Royal Agricultural Society had in recent years recommended the use of ploughs for two distinct purposes—the ordinary ploughing, and a deeper ploughing once in four years, when the root-crop recurs, to give the land a more thorough stirring. A common plough fits for this extra work; but all farmers 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 Cattewater in 1844, considered the first ploughs especially well adapted to the English plough. Elephant ploughs were ranked inferior in power and efficiency to ploughs with iron wheels, made by Ramsone, 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 Messrs. Rawnsome, of a four-horse plough, was entirely adopted 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, in his treatise on the subject, warns us with praiseworthy caution: "I still look forward to the time when its usefulness will be further 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 old-fashioned harrow was always made with square bars and square-set teeth; but as it was difficult to make such a harrow work always in different tracks, even though dragged from the corners, modern makers have constructed harrows which have the teeth set cross-wise, enabling the machine to follow the furrows of the land. The 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 lines, 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.—It was forty years ago that the late Mr. Philip 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 placed over small cloaks so smoothly as to finish the soil, not to grind them. M. Claus, 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 independent motion, but to form a single roller when drawing the soil have, however, been nearly superseded by the 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 baked by the sun; it is also a good presser for young wheat in March, when the soil has been swollen, and the roots thrown out by alternated frosts and thaws. The jagged iron teeth form the characteristic feature of this implement. Mr. Gibson has since improved it by putting it round a central axis, containing a series of eccentrics 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 one ordinary four-course system of arable culture, the land receives seven or eight ploughings in the four years; but if a scorifier be employed to pare the surface to a depth of two inches immediately after the wheat harvest, much of the four years' labour will be economised. Many forms of these time-saving implements have been invented. Coleman's scorer, with six horses, is adapted for very hard ground. Biddle's, made by Messrs. Ransome, is suitable for going deeper into looser ground. Kirby's and dent's plow plows are midway. They are suitable for ordinary ploughs and scorifiers, and are useful for a very close surface of land. Cotgreave's plow is a cultivator, in which the processes are combined in rather a curious way: while the plow cuts through the turnips, the plowshare cuts up the root and it digs another 5-inch furrow, inverts the soil, and deposits it on the top of the first; and lastly, a sub-pulveriser loosens the soil to a further depth of 3 or 4 inches. Beauchler's potatc plow and subflower may be likened to a common plow with an Archimedes screw attached, which revolves in the bottom of the furrow, thus ploughing and
subsoiling at the same time. Such farmers as have duly provided for some of these various investments, find that they may lessen their ploughings from 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 ever steam be employed successfully in cultivating fields they may be lessened by half or diggings 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 of them have been made to introduce steam-engine 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 small rollers, reversed, rotating, and the engine. Another, brought forward about the same time by Mr. Fiskin, 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.

Implement 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 digging the furrow and throwing in ridges at a particular angle, which was formerly deemed necessary as a preliminary to hand-sowing. The drill is, in fact, 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, distributing them beneath the ground by 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. The 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-coultler the requisite amount of water mixed with powdered manure. Some, to economise manure, drop 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 numbers of coulters, which enables it to contribute 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 drills have greatly improved; and they have constructed a hand-harrow drill for distributing grass-seed broadcast in a very effective manner. Messrs. Horsey 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 coultier, instead of using a series of tin cups; 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. Messrs. Goss have introduced the self-adjusting steergage 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 thickest sewage. In short, the drill is now an implement to which all the farmers devote very sedulous attention.

Top-Dressers or Manure-Distributors.—Although wheat is sown with the manure-drill, being invariably composted 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 use to be applied by hand has been greatly increased, both of which one is by Mr. Holme; he has been invited to perform the operation in various districts. 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 method is as simple thus: the ridged rooting of modern horse-hoes of Messrs. Garrett and other makers has at one time four rows of turnips, six of beans, or nine of wheat. The modern machine does the work at half the expense of the hand-hoe, and much more completely. A modern rigid coal-boundage for the purpose of gathering the folk farms; by its revolving principle the plants and soil attached are thrown up together, but the soil by its greater weight reaches the ground before the plant, which, lying bare with its roots exposed on the surface, soon withers away.

Harvesting Instruments.

Reaping-Machines.—No other implements applied to agriculture have attracted so much attention within the last few years as reaping-machines; partly for the singular ingenuity displayed in their construction, and partly owing to the emulation between European and American inventors. At the opening of the present century it was thought that a successful reaping-machine had been constructed; but Parliament loi the labour of the unskilled laborer it was so intricate as speedily to fall into disuse. Another was invented many years afterwards, which cut off the heads of the corn, but left the straw standing—a fatal defect. When machines had been invented for reaping, it was found that the modern machine of Messrs. Garrett could reaping-machine at once rivetted attention; Mr. Hussey competed with him by means of another invention; and the different implement-makers, entering into manufacturing arrangements with these and other inventors, speedily increased the number of reaping-machines. The most modern part of each machine is a horizontal saw or serrated knife, which by a rapid reciprocating motion cuts the straws very near the ground; while there are peculiar adjuncts for laying down or depositing the straws with their ears of corn regularly after being cut. This display of Hussey's and McCormick's machines in Hyde Park led to a curious revelation. The world then learned, almost for the first time, that England, or rather Scotland, had long possessed a reaping-machine of somewhat analogous character, although not in use. The facts brought to light were in brief as follows: In 1827 the Rev. Patrick Bell, son of a tenant farmer on Lord Panmure's estate in Scotland, became impressed with the disadvantages under which the farmers lay through a critical period of the year, and he constructed a rude machine intended to do much more in a given time than a sickle would perform. The machine acted on the principle of the sea scythe. Mr. Bell, from a model, constructed a wooden model with his own hands, and then had the iron-work fashioned from it by a village blacksmith. He first tried his invention in cutting some oat straw stuck up by himself on end in a layer of mould in his father's shed, and then observing certain deficiencies, he made an attached piece of apparatus to deliver the corn in regular swathes; and another for collecting and pressing the corn against the cutter. The invention soon became known to the neighbourhood; others were made on the same model; and the Highland Society's premium that was year given to Mr. Bell; but, probably from defects in the construction, the machine did not work satisfactorily to the farmers, and they declined to use it. To an offer made by Lord Panmure, to give the inventor the use of his patent, Mr. Bell replied that he had no wish to make a profit out of any agricultural invention. For twenty-four years the subject was allowed to stagnate; insomuch that when men were told of the humble Scottish minister's reaping-machine at the Royal Agricultural Society. At the Carlisle meeting, for instance, in 1856, there was one of Bell's original construction improved
Another is, that if a farm be of small or moderate size, it will not support the expense of a fixed steam-engine; whereas a portable engine may be available for two or three farms, at a fair ratio of expense for each. A third is, that whereas threshing can only be done under cover in barns by fixed engines, it is perfectly feasible in the open air by a locomotive engine—a plan, healthier and more expeditious for the labourer, and rendering probable a greater consumption of farm produce, requiring to be constructed by the landlord.

The Royal Agricultural Society gave the first impetus to the construction of moveable steam-engines for farm purposes; and the annual prices and exhibitions have been very influential in determining farmers to make improvements, to the great benefit of agriculture. In the collection of 1851, there were engines of this kind exhibited, made by Horsey, 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 horsepower varied from 4 to 9; the time of getting up steam, 28 to 83 minutes; the coal used in getting up steam, 0.1 lb. to 75 lb.; the coal consumed per horse-power per hour, 0.79 lb. to 25.80 lb. Mr. Locke, the eminent engine inspector, in 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 boiler and the engine, more to the condenser, and less to the size of the cylinders. It 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 upon the first abolition machine was made. The maximum consumption of coal per horse-power per hour was 10 lb.; while the minimum (in Tuxford's engine) was only 3.7 lb. It was, however, considered by some of the farmers that this was somewhat too exclusively attended to. "The conditions of 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,' requiring the nicest care; instead of those 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 prize engines to subsequent trials, for a lengthened 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 500 engines per annum. Some of the makers had completely abandoned the idea of portable engines, and were concentrating on making the bath machinery, cutting chaff or roots, grinding corn, pulping mangold-wurzel, splitting beans, sawing wood, pumping water, and lending their boiler for steaming potatoes or roots.

**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. A.m, the agricultural engineer, however, that a large amount of power was wasted in dragging dead weight; and he found on experiment in 1849, much to the astonishment of farmers, that in a four-horse machine the strength of which was equal to 2,000 lb. of good iron work itself, while only one horse-power was 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 eventually, one horsepower in each 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; but in the other, the levers work as in a horizontal plane by the aid of machinery. Several threshing-machines were tested by the Exhibition Jury in 1851; they differed greatly in excellence; but on an average they required fifteen-horse power to thresh two and a-half, two, one and a-half, and oneshared hares per hour, 10 horse-power per minute for barley. It was found, however, 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...
grain, and unimpaired straw. Maltsters continued up to that year to distrust machine-threshed malting barley, on the ground that the grain 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. 5d. per quarter, all expenses included, at a resulting cost less than 1s.; and it is therefore if quality were good, that very much of the quantity supplied would unquestionable be of 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 each, but the best estimated 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 carting; 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 for as far as they can be let out by their owners to different farmers, always to be on call according to exigencies of the harvest. No kind of agricultural machinery has met with more opposition from hand-labourers than threshing-machines; but the prejudice in favour of the old and in the main is dying out in this as in other directions. It has been recently the case, however, that not without a lesson from 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."

Threshing-Machines—It may have been corn to the wind, as in the old process, it is now winnowed by every ingenious and intricate machinery. Malters Hornby were among the first to achieve success in the construction of such machines. Their winnowing apparatus is fitted with a spaded roller, working through a graining frame of the sort of hopper; it separates the corn from the trash 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 chalk 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 tailings," "tailings," "whites," "screenings," and "chaff," at the rate of fifteen quarters an hour, and a grating over for separating the trash, at the rate of twenty quarters per hour. Not only has the skill been nearly superseded by the threshing machine, and horse-power by steam-power, but the threshing-machine itself has improved. Where before the corn was brought out in a rough way, as it was in 1847, has now been brought to a perfect state 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 jays 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 for cutting the turnip. It is an important part of the rural life on farms of any extent; and the cost of making and using a good turnip-cutter is a return on the land by which the agriculture of the country is burned in, where it is dried, and is finally cut and threshed. The fuel in making one of these machines is oil, which is burnt in a stove; this has two advantages; it may be seen that the machine is by far more economical in the use of fuel than any of the old-fashioned machines. This is an important advantage of the new machines, which are capable of covering an acre in a day. The turnip-cutter is operated by one horse, and is made to cut the turnips into turnip-cucts, which are then utilized as a food for live stock. These machines are made in various sizes, from small ones for use in private farms to large ones for use in large estates. The cost of a large turnip-cutter is about £50, and it can be operated by one man. The advantage of this machine over the old-fashioned one is that it can be used in all kinds of weather, and is capable of doing the work of a dozen men in a day.

Chaff-Cutters.—The cutting of straw into very small pieces, to supply the deficiency in natural chaff for cattle-food, is at first done by hand, with a sort of knife hinged at one end; then by a series of knives working round an axis, and driven by a horse,中国古代的合作社在丰收季节用这种机器来制作草料。"The spectators," said Mr. Pusey, on whose estate the machine was tried, "are surprised to see two
The machine is worked by two horses; the man is firmly and easily fixed into the ground, affords a three or a four-horse team from a great height, working at an easy speed. The chief defect in the earlier specimens was an inequality in the level of the channel excavated by the plough, because the upper and lower parts being fixed at an equal distance apart, any unevenness of the surface was hidden by the unloading drum below. This defect was partially remedied afterwards; but the difficulty of ensuring horizontality in the drain has continued to be an obstacle to the use of this machine. The cost being considerable, but a large landowner would find profit in buying such a draining plough; but the machine can easily be let out for a month, or other definite period.

The aggregate result of all these various improvements in the construction and application of agricultural implements is overwhelming. Mr. Pease, in reporting on this subject, as Chairman of the Exhibition Jury, in 1861, stated the estimate was: By using lighter ploughs, cultivators that lessen the necessity for ploughing, drills that economise both seed and saving-power, horse-hoes instead of hand-hoes, varied nature of manure, and other advantages, to the done right pumping-plant, fixed and portable steam-engines, steam-threshing and winnowing machines, turnip and cut off cutters, drainage-pipes and drainage-plants having been affected in £20,000 of one-half the former outlay in cultivating a definite amount of corn.

It had been rendered further demonstrable that machinery which had been comparatively uncertain in culture, by enabling many of the operations, in double, in or under arrangement, to be done right by machinery, 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 Implements displayed at the Paris Exhibition De L'Industrie, in 1855, in which he endeavoured to estimate the material advantage accruing from the use of machinery in agriculture. Mr. Sidney, at the close of 1857, gave a few figures intended to prove that, in the course of twelve months, great quantities of land had been concentrated on and saved in the cultivation of corn. The estimate was that within six years—that is, since Mr. Pease prepared the Great Exhibition report—the landowners of the United Kingdom had expended ten millions sterling in draining two million acres of land, on principles which, at the time, were supposed to be sound. Every acre that was saved in 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.)

All this is more than can scarcely be said to exist yet in England. Notwithstanding the acknowledged importance of exact information as to the amount of our agricultural production and consumption, especially in corn, and the interest that is taken in the subject as shown by the attention given to it with, in London, in connection with, in London, the question of the corn laws, there is a little better than ingenious guesses, no steps have yet been taken to secure a correct estimate of the expected amount of the coming crops, and the state of live stock. Such estimates as are made are, of course, of little value; and something which nothing can be more fallacious. The great differences in cost, cultivation, and even of climate in England, make the application of the doctrine of average almost more indisputable in agriculture than in any other trade. It is by the occurrence of exceptional results in one trade being looked upon as a law in another agriculture as in everything else, and the more any subject has the appearance of chance, the more necessary it is that the experiences should be registered, in order to arrive at the law expressed by an average. The inconvenience and loss occasioned by the absence 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 35s. 6d.; the lowest price being 20s. 6d. In October, the price improved; but in November it again fell to 50s. But as soon as the new year had begun, symptoms of scarcity, manifested themselves, and the wheat of that same harvest, notwithstanding its large quantities, 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 from the vast sums of money spent on the purchase of corn, 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 speculative corn-dealers would have been saved to the community.

The desirability of some knowledge on so important a subject has led many individuals to form, from the best available sources, general estimates, but the discrepancies show the unreliability of such estimates for any practical purposes. Some endeavoured to arrive at it by taking the acreage of the kingdom, the proportion supposed to be cultivated, and the amount of corn grown, as estimated by Mr. Gregory King, who wrote in 1665, was among the earliest. He estimated England and Wales to contain 36,000,000 acres of which he supposed half to be uncultivated. Davenport, Gove, Tappin, and others, arrive at results, which, as far as they can be made to agree, estimates varying from 31,048,000 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. This estimate was stated at 37,324,916 acres, which was very near the estimate of Dr. Becke, who gave it as 38,498,579. Others, again, have endeavoured to ascertain the consumption by multiplying that of each individual by the number of the population, but here they differ materially, varying from 6 bushels to 8 bushels for each individual, an unsatisfactory difference of one third. We will now enquire what measures have been taken in providing statistics by the government.

What are called the corn averages, of one or more 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 1851, such returns were collected from the principal seaports and boroughs—stating the average price of corn at the time of the imposition of duty on foreign corn; the collector of the returns was appointed by the magistrates of the town or borough in which the return was made, but the salary was paid by the government. In 1821 a change was made. The returns were collected, not by the local authorities, but by the towns in England and Wales. Every corn-merchant, miller, baker, and malster, was ordered to make weekly returns to the inspector. The inspector provided a place for the reception of those 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 averages from the various places, and obtained the total average for the whole kingdom—which average regulated the duties on 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, to the advantage of the corn merchants; for 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 price of corn, and lowering the cost of living. Whether wise or not, led to the appointment of excisemen, 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 sliding-scale was stopped, 85,279 acres were made; the corn averages ceased to be as valuable as before in respect to fiscal regulations; but they remained important in connexion with the commutation of tithes; and it is now considered that they might render useful service to the community.
the agricultural statist. 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.

In these returns, it is evident, nothing beyond the average prices. In 1832 the attention of the government was directed to the attainment of more satisfactory results. In the previous year, a statistical inquiry had been made by a committee of the magistracy of Norfolk, respecting the agricultural statistics of that county. The committee distributed circulars to 650 parishes; but 354 of these declined to answer the questions submitted to them, and the committee had no other resource than to infer from the 496 affirmative to the latter, that the result was useful as a beginning; and in 1832, 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 clergymen of 156 parishes in Bedfordshire, enclosing schedules of the returns required, and asking for co-operation. This experiment yielded a signal failure; for out of 156 parishes to which the circulars were applied, only 27 returns were answered. 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 experiments. Still, though the result was a failure at that time, in 1837 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 which evidence was taken of the practical difficulties with which they 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 this duty, and that the Board of Trade resolved to make another attempt, or rather three small attempts in 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 Scotch inquiry was 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. This was almost a waste of time; for only any returns were obtained; and a strong impression was left that nothing less than compulsory powers would be available for obtaining the desired statistics.

The next attempt was made in 1847, when Mr. Miller Gibson, then the head of the Board of Trade, brought into Parliament its 1847 Bill to provide 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 Registrar-General of Births, Deaths, and Marriages; the superintendent registrars throughout the kingdom were to be charged with the appointment of agricultural enumerators; and the enumerators were to prepare lists of all the occupiers of land, including those having three or more acres, and blank forms to those occupiers, and to collect those blank forms after a 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 Registrar-General, and by him to the Board of Trade. These returns and tables were to apply to the month of June in each year, and the first time in the public, was not yet learned to feel much interest in the subject, and as 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 statistics of the returns of the corn exported. The selection was unfortunate, for the impression was instantly received that the returns would lead to additional assessment, and no explanation availed to remove 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 its case, however, the returns were found to be useless. Many Unions refused altogether, alleging that their officers had sufficient other duties to perform, and it was suggested that these complaints were the result of the continued opposition 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 introduce 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 recommenda-
the assistance of farmers; he 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 returns are continued annually, and though there have been a few omissions, are the most complete in their details of any yet known.

Though the absence of similar returns of Scotland deprives them of much of their value, they are still, conjoined with those of Ireland, of great importance. We give an abstract of the returns for 1856 and 1857. We may premise that the returns are from holders paying a yearly rent of 10l. and upwards (exclusive of tenants of woods, villas, feuars, householders and the like) in all the counties of Scotland except Ayrshire, Inverness-shire, and Partick; and the counties of Strathclyde, of which the Ivean part 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, sheep-walks, houses, roads, and waste, are omitted in the calculation.

In 1856 the number of occupants was 42,919; in 1857 there were 43,492. The number of acres under rotation of crop was 3,045,191 in 1856; of which, of wheat there were 226,526, of barley 176,204, of oats 915,816, of rye 4029, of bere 15,368, of beans 40,740, of peas 4617, of vetches 18,231, of turnips 460,131, of potatoes 149,331, of mangold 3531, of carrots 1523, of cabbages 1485, of rape 1407, of oil-seed 3732, of turnip-silage 1709, other crops 14,464, and grass hay and hay rotation 475,776, which leaves 1013 of the stated total unaccounted for.

The produce was 7,370,352 bushels of wheat, 5,851,970 of barley, 31,966,361 of oats, 6,540,267 tons of turnips, and 413,800 tons of oats and turnips, in 1856. In 1857 the total number of horses under crop was 5,566,672, of which there were wheat 228,125, of barley 196,387, of oats 938,013, of rye 9988, of bere 21,007, of beans 39,196, of peas 8675, of vetches 18,418, of turnips 476,591, of potatoes 139,819, of mangold 1104, of carrots 1761, of cabbages 184, of rape 152, and of oil-seed 304, of turnip-silage 2576, of other crops 577, of bare fallow 10,582, and of grass and hay in rotation 1,469,080, an excess of 989 acres over the stated total. The produce was 8,231,864, 6,494,456, 3,306,963, 16,142,180, 18,166,434, 4,009,790, 6,690,109 tons of turnips, and 430,460 tons of potatoes. In 1856 the total number of horses was 177,953, of milk cows 209,900, of other cattle 473,384, of calves 197,709, of sheep and lambs 616,500, of swine 125,984. In 1857 the numbers were, of horses 185,469, of milk cows 303,918, of calves 195,196, of sheep and lambs 5,683,185, and of swine 140,354. 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 about 50,000 acres of landage are held by occupiers not in these returns. Fife and Haddington 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 constabulary in 1853, and they have been continued annually since. We append the return of 1857:—In that year the returns show that there were 5,860,069 acres under crop, being an increase of 106,642 acres over the quantity in 1856. Of these 662,881 acres were in oats, 1,077,753 in peas, 424,725 in beans, peas, &c., showing a small increase of cereal crops generally, but a decrease on oats of 56,559 acres. On green crops there was a general increase of 45,637 acres, potatoes occupying 1,145,950 acres, an increase of 42,216 acres, and flax had decreased from 106,311 acres in 1856 to 98,074 acres in 1857; and turnips had decreased 4,487 acres. Meadow and clover had increased from 1,203,787 acres to 1,369,421 acres. The produce of the 6,753,681 acres in cultivation in 1856, had been 2,756,183 of wheat and of which 14,775,041 barley of oats of 14 stone each; 1,367,452 barrels of barley of 16 stone each; 50,709 barrels of beer of 16 stone; 72,165 barrels of rye of 20 stone; 431,661 bushels of beans and peas; 35,206,346 barrels of turnips, and 7,970 tons of turnips; 2,654,322 tons of manure; 333,650 tons of cabbages; 3,006,533 stones (14 lbs.) of flax; and 3,492,723 tons of hay. The total number of holders of land was 592,498; of whom 36,474 held not more than one acre; 82,095 not more than five acres; 179,334 not more than fifteen acres; 159,454 not more than
thirty; 71,156 not more than fifty; 53,279 not more than one hundred; 21,292 not more than two hundred; 8943 not more than five hundred; and only 1655 held upwards of five hundred.

Live stock, except sheep, had increased remarkably. The number of horses was 600,693, an increase of 27,385; the number of cattle, 3,618,544, an increase of 30,686; the number of sheep, 3,468,676, a decrease of 245,618. Pigs numbered 1,283,532, an increase of 333,637.

Road contractors in Ulster are required to keep the roadsides and fences free from weeds, and surveyors in the other provinces are recommended to obtain authority from grand juries, &c., to enforce in them similar regulations.

The above are some of the causes which have formed the basis 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 civilized world, what are called the chances of agriculture would probably be reduced to a certainty, and the price of food would remain with little or no variation.

AGRODROMA. [ALLAUNE, S. 2.]
AGROSTEMMA (from ἀγρός, a field, and στέμμα, a crown), a genus of the order Compositae. Of the three species of this genus, one is Agrostemma cocconeum, in ordinary culture.

AIGUESMORTES. [GARD.]
AIGUILLON. [LOT-ET-GARDONNE.]
AKIN, ARTHUR, the eldest son of John Akin, M.D., was born in 1784. Arthur Akin began his literary career, we believe, as editor of "The Annual Review," upon the title-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 this 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. Akin was the resident secretary of the Society of Arts, and a frequent contributor to its "Transactions."

Ain was also one of the oldest fellows of the Linnæan and Geological societies. Mr. Akin 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 attenders of the meetings of the learned societies in the metropolis, and was generally esteemed. He died at his house in Bloomsbury, London, April 15, 1854, in his 81st year.

AIRA, a genus of Grasses belonging to the tribe Stenarias, and distinguished by possessing a lax panicle, two-flowered glumes, the outer pale terete on the back, and a dorsal awn. There are several species, but that which is best known is A. cepaeus, 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 four 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, on the banks of rivers and of canals, in parks, and other open places.

AILBE, RIVER. [YORKSHIRE.]
AITIONA (after Mr. W. Aiton, for many years head-gardener at Kew) a genus of plants belonging to the order Meliaceae. The A. Capensis 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 fertile plain, and on the south-east from the Perengah 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; and is now the capital of the province of Akhalzikh. [GRASZIA.] The town is fortified, and of considerable extent. The most remarkable building after the citadel is the mosque of Ahmed, which is built on the model of that of Santa Sofia 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. Petersburg. The Armenians have several large churches, and there is a mosque and a synagogue. The trade is in silk, tea, and money; there is some transit trade, as 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 of 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 14° lat., 36° and 39° 30' long. It borders on the south of the province of Sergipe 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 Paulo Affonso. 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 extends to the eastern coast. These mountains come close up to the river San Francisco as far east as the mouth of the Rio Sacaro, and terminate in Alagosa, at a distance of about 30 miles, or little more, from the sea. This region is almost entirely covered with wood, and contains a vast wealth of timber, which affords 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 extends an undulating country, the climate of which is so equable as to afford about half the country between the declivity and the sea. It is likewise wooded, and has a light soil, very fit for the culture of cotton, which is rapidly extending. The country along the sea-shore, and at a distance of about 10 miles somewhat less from it, is low, level, and covered with a thick 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 undulating tract. This soil is of the best quality 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 4 to 5 feet, enters the mouths of the rivers, and has changed the adjacent country into a marsh. The large lagoons of the coast, one of which is called Lagoa do Norte, and the southern Lagoa do Sul. Its water is salt. Only canoes can navigate the river Alagosa, 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 Alagosa, whence it is transported to the harbours of Taragua and Pajassara. Farther south is the Lagoa do Sitiquia, 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 coast along this section is in general low, with a few small hills along it, and with only a few small capes. The major part of the coast of this province is opposite to the province of Sergipe. Currupipe, 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 channels in the reef, but the sea is not generally good. The river which flows into this channel 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 Alagoas at its western extremity at the great cataract of Paulo Affonso, where it is said to descend 50 feet in perpendicular height. It then runs for some 80 miles to the Alves do Caninde, forming several mists 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, and it is impossible to navigate it. The mouth of the river is formed by the confluence of several brooks, which are of moderate height as far down as Caninde. Below Penido the river enters the alluvial tract, in which it divides into several branches, forming a great number of islands, generally low and abundance which, when united, form a barrier which is washed by rice, maize, mandiocé, sugar, and vegetables are raised in abundance. In the rainy season they are overflowed. The branches of the river unite again, and it disentangles by two mouths of different size. The latter is the larger, being nearly 8 miles wide, but has so little depth that smacks can enter it only at high-water, and must there wait for the full tide to go out. They sail as far up as Penido, 25 miles from the mouth. Father up the navigation is solely by ajacis, that is, two or more canoes moored together with cross-pieces of timber below. 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 ajacis always descend the current, which is swift, though not very rapid.

The climate is hot and humid. The heat 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 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 completely been deserted, and has been replaced by sugarcane and cotton, which at present constitute the staple articles, the first being raised in the alluvial and the second in the undulating tracts. As food are raised—mandiocé, maize, rice, plantains, yams, and fruit-trees, so as to supply the wants of the inhabitants. The most common fruit-trees are oranges, pine-apples, jack-trees, cocoa-nuts, and palms. The mamona-tree is carefully cultivated in some districts on account of its oil, which affords a great article of export. Alagoas has extensive forests of rubber-trees, even in its lower districts, and affords the best rubber in Brazil. It is exported to Bahia and Recife; and many small vessels are built in the province. Some of these vessels are very durable, especially those named Sueciras, Pe Reos, Vintamico, and Tataba, but their wood affects the iron."}

**ALAGOAS**

Alagoas, the capital of the province of Alagoas, in Brazil, is situated in 9° 40' 8" S. lat. 30° 60' W. long. It is built on the western margin of the lake of Manguaba, by means of which, and on the other side, the inhabitants of the rich country surrounding the lake to the harbour of Taraga. This produce consists chiefly of sugar and tobacco. The town has a population of 12,000, and contains several convents and a grammar-school. The country about it abounds in fruits, especially orange-trees and jack-trees.

Henderson's *History of Brazil*

**ALAININE.** (Chemistry, S. 1.)

**ALAUDA.** (Alaudinae, S. 2.)

**ALAUDÆ.** The name of this order is derived from birds belonging to the order Passerina, and the family Corvidæs, is thus characterised by Mr. Swainson:—

Bill more lengthened than in any of the Fringilleæ; the tip entire or only slightly notched; the cilia slanting, the bill much lengthened, pointed, and generally as long as the quills. Claws very slightly curved; the claw of the outer toe always shorter than that of the inner toe; the hinder claw considerably lengthened, and either nearly straight or very slightly curved.

**Alauda.** (Linn.)

Bill cylindrical; nostrils concealed. Wings very long; no spurious quill; the first, second, and third quills longest, and nearly equal; the rest considerably graduated; tips of the lesser quills emarginate. Tail forked. Head crested. (Sw.)

The Larks are characterised by their having the hind-claw, which is like the fore-claws, somewhat straight, and longer than in the pipits and the wag-tails. The bill is straight, and rather short and strong, the upper mandible being arched without any notch, and not longer than the under. The nostrils, situated at the base of the bill, are oblong, and protected by small plumes and bristles directed forwards. The feathers on the back of this part of the body can be raised up at the will of the bird into the form of a crest.

Various species of Larks are found in all parts of the globe, and are everywhere distinguished by their vigilance and their singing. They are pelagic, and frequent the sandbanks, and other open places. The formation of their feet, except in a few instances, such as the wood-lark, does not adapt them to perch upon trees. They accordingly always build on the ground, making in general a rather slight though neat nest, and laying about five eggs, usually
of a grayish white, with specks of a brown colour. They frequently rear two broods of young during the summer.

The species are found in various parts of the world, including Britain, where some remain during the winter, the greater number flock together and migrate, either southward or to the seacoast. 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

**Localities—Europe and America.**

Mr. Swainson considers this as the Fissirostra type. It is found in various parts of Africa, but not in the south of Europe. It is the most abundant species in 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 culmen curved and convex; the commissure arched; the tip of the upper mandible wide above 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. Africa. The Denticirostra type—*C. magnumstris,* Ois. d'Afr., pl. 193. (Sw.)

Sub-genera—*Myosbrus,* Horst. *Bill as in Calendula.* Wings short, rounded; greater quills hardly longer than the secondaries and tertials; the first quill very short, half the 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., xiv. 1819.

*Brocardis,* Sw. (*Brochomyx.*)

*Bill as in Calendula.* Hind claw very short. Wings and tarsi much lengthened. Africa. (Sw.)

*Agrodroma.*

Bill slender, considerably compressed; both mandibles of equal length; the tip of the upper one 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, pointed, and emarginate at their tips; even. Legs long, pale, long, slender. Tarsus longer than the middle toe. Lateral toes equal, but the outer claw shorter than the inner. Colour brown, lark-like. Distribution universal. The Incisoria or pre-eminent type—*Agrodroma rufescens,* Earl., 1661, f. 1. (Sw.)

*Macromys.* (Sw.)

Bill slender, compressed, thrush-like, entire; nostrils large, naked, the aperture lateral. Wings short; the primaries not longer than the tertials, the first four of equal length; the rest rapidly diminishing, and emarginate at their tips; foot moderate. Feet enormous. Tarsus and hinder toes very long, and of equal length. Lateral toes unequal, the inner shortest. Africa. The Rascular type—*M. factoticola,* Ois. d'Afr., pl. 193; *M. factotum,* Sw., *Birds of West Africa,* ('Naturalis exotica,' Ornithology, vol. vii., p. 216.)

*Certíbulus.* (Sw.)

Bill slender, lengthened, more or less curved; nostrils round, naked. Wings very long; the first quill spurious; the next three nearly equal. Tail moderate, even. Feet lengthened; the lateral toes equal; length of the hinder claw variable, although typically short and straight. Africa. The Tenuirostra type—*Certíbulus longirostris,* Ois. d'Afr., pl. 192; *C. bifasciata,* Rüpp., 'Atlas,' plate 5; *C. nitens,* Sw., *Birds of West Africa,* (vol. vii., p. 215.).

Such are Mr. Swainson's drawings, and the arrangement of this sub-genus. (Felodilus.) The genus *Anthus,* Bechst., is placed by Mr. Swainson at the end of his sub-family

**Motacillina (Wagtail), under his family Spericidae (Warblers).**

**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 Water Treatise.' He had previously noticed the remains of the lark in Kirkdale Cave. ('Reliquiae Diluvianae,' pp. 19, 34, plate xi., ff. 24, 25.

ALBRECHT, WILHELM, was born in Germany, in 1786. He was one of the most distinguished pupils of Thaser, in the gymnasium at Mönchengladbach, and afterwards taught rural economy in Fellensberg's school at Hofwe.

In 1819 he was employed by the government of Nassau to edit a weekly publication devoted to agricultural subjects; and in the following year he was made director of an (ex-) experimental farm attached to the modern school. The experimental farm was transferred to Geisa, near Wiesbaden, and it became as long as distinguished as the source of agricultural improvements for the west of Germany. As it was found impossible constantly to employ all the pupils on the farm, Albrecht determined to open the school, during the six winter-months, for instruction in the theory of agriculture; while in April of each year the students went to the homes of their parents, or to some farming establishment, where they could familiarise themselves with the practical labour of an agriculturist. During the life of Albrecht the school was highly successful. "The best students for our institute," said he, "are young men from about sixteen to twenty-two, who after distinguishing themselves at the school, "he followed among them for some years at home, or on some well-managed farm: they bring a well-disposed mind, not fatigued with study, nor distracted by too many pursuits." While managing these establishments, Albrecht besides his weekly paper, edited the "Annals of the Agricultural Society of Nassau;" to which society he was perpetual secretary. Albrecht died in 1849, at his house in Franconia, whither he had retired on resigning the direction of the establishment at Geisa, a time previously. (Novelle Biographies Universelle, 1822.)

ALBUCA (from albus, white), a genus of plants belonging to the natural order Liliaceae. The species are mostly found at the Cape of Good Hope. They are cultivated in this country, and require the treatment of greenhouse bulbs. ALBURNUM, ANIMAL AND VEGETABLE. [Carruthers, S. 1.]

ALBUS. (From ALBANESES, a people in Phocis.) [Stokes, S. 1.]

ALDEHYDE. [Chemistry, S. 1.]

ALDEHYDIC ACID. [Chemistry, S. 1.]

ALHAGI (from the Arabic Aghul or Agul), a genus of plants belonging to the natural order Leguminosae. The species are under-blooms or herbs with simple leaves and small stipules. The flowers are red, and disposed in racemes along the peduncles.

A. MAURUENSIS is a native of the deserts of Egypt, Syria, Mesopotamia, and other countries of the East. This plant yields a species of manna, which is called Trumphin or Tropilin. It is chiefly gathered in the neighbourhood of Tabira where the plant grows abundantly. The manna is a natural exudation from the leaves and branches of the plant, and is most abundant during hot weather. In Arabia it is supposed that the manna falls from heaven on the plant. It first appears in the form of a small drop as of honey, which goes on increasing in size till it is about as large as a coriander seed. The manna yielded by this plant does not appear to be inferior in quality. It is exported to the present day in Persia, and is known by the name of Pemn Manan. It is employed as food for cattle. Two other species, *A. Candeloras* and *Nipalnianus,* are described by botanists, and cultivated in the greenhouses of this country.

ALASKA, a peninsula projecting from the N.W. coast of North America into the Pacific Ocean, and separating, together with the Aleutian Islands, the Kamchatska Sea from the Bering or Tcheking Sea. The peninsula is 1000 miles long and the isthmus which separates that lake from Cook's Inlet, may be considered as forming its natural N.E. boundary. A river, called Kortchak, or Bristol River, issues from the lake, and falls into Bristol Bay, or the Bay of Kane. From the S.W. side of the lake of Iliamna the peninsula extends in a general direction from E.N.E. to W.S.W. between 55° and 64° 40' N.lat.
between 153° and 163° 40' W. long. It is more than 410 miles long, and opposite the mouth of the river Nahnek (157° 50' W. long.) 110 miles wide, but its breadth decreases in proceeding farther west, where in some places it is hardly 20 miles wide. It terminates at the strait of Issanak, which separates it from the island of Oonmak.

The two coast-lines differ greatly in aspect. The south-eastern shores rise with a steep ascent, are indented with numerous bays, and islets, and marked by inlets, rocks, and reefs, partly under and partly above water, 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 north-western shore is generally flat. When its term begins it becomes sandy and sandy beach, and has only a few open bays, but it is free from the inlets and shoals, and offers in many places an anchorage of moderate depth. A chain of mountains extends through the peninsula from the strait of Issanak to the islands of Ittanma along the south-eastern shores, but east of 155° 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 extreme, and from four to six. All are covered with snow, but farther east it becomes considerably lower.

It is remarkable that in the western and more elevated portion of the chain, which consists mostly of volcanic rocks, and where some still active volcanoes exist, there occur four towns, the coast of the nine, in the mountainous regions, to such a depth, that their surface is not many feet above the sea-level; the soil in them consists of loose sand, and it appears likely that these depressions were once straits, and the most south-western part of the peninsula a series of islands, lying parallel to the 155° W. meridian, and resembling the eastern islands of the Alentian chain, but the straits have been filled up by sand in the process of time.

The low country along the Bay of Kanasoko consists mainly of sandy wetlands, and the marshes contain many swamps, and in others with moses. Several plants grow on it, and bushes 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 plants from the district just noticed, except that their 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., and 160° 40' W. long.), between which and the Bay of Pavlovskaja the peninsula is narrowed to about 14 miles. Along the south-eastern coastal seaports are met with. The most considerable from west to east are Morjevaskaja, Belkowski, Pavlovskaja, the Bay of Wrangell (156° 30' W. long.), the best of them all, and also the Bay of Tsimly.

The Russians, who have a few settlements almost entirely inhabited by natives on both coasts, have introduced agriculture, and through no kind of grain succeeds, the inhabitants of the few dispersed villages raise considerable quantities of wheat and rye. Their domestic industry is principally from fishing, the sea abounding in cod, sole, turbot, and several kinds of mollusca. Whales are frequent along the northern coast, and rather rare on the southern. Morose 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. Rein-deer, bears, and red foxes are the only large land beasts with success hunted. Their dogs, which are all also wolves, and a kind of mountain-sheep, perhaps also 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 in the establishment of Onogashika, and those east of it on that of Kodiak. The largest of those settlements is the village of Katmatokai, on the Bay of Katmai, which has 90 inhabitants.

(Latue's Voyage autour du Monde; Kruisenvagen's Voyage round the World; Ketzeboe's Voyage of Discovery to the south.

ALLAMANDA, a genus of plants belonging to the natural order Apocynaceae. It was named after Frederick Allamand, who journeyed in Guiana, in 1769, and afterwards in Russia. He was a correspondent of Linneus. 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 position to make them thrive. An infusion of the leaves of A. catartica is said to act as a powerful purgative, and an overdose to produce poisonous effects.

And the late WILLIAM, was born in Edinburgh in 1739. 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 Wilkie was his fellow-student. In 1757 he proceeded to London, where he 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, Tatar, the shores of the Black Sea, &c., and everywhere industriously employing himself in gathering materials for his art.

On his return to Scotland in 1814, he made a public exhibition of the rare sketches and finished pictures of Tartarian, Tartar, and Circassian scenes and costume. 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 Sir Walter, who, being in possession of it, is. From this time Allan settled in his native city, sending regularly some of his works to the exhibition of the Royal Institution. For a while his pencil was chiefly employed on the country scenes to which he had travelled; he then turned to the annals of his native land, and for several years was mostly engaged in illustrating the history or the romance of Scotland. To this period belong the 'Murder of Archbishop Sharpes', 'Parting of Prince Charles Stuart and Sir Robert Macnamara,' 'Knox condemning 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 vary a change of climate, he visited Italy, Asia 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 the Royal Academy. In 1825 he was elected an associate of the Royal Academy. In 1836 he became R.A. In 1838 he was chosen, on the death of Mr. Watson, to be president of the Scottish Academy. On the death of Wilkie in 1840 Allan was appointed to succeed him as her Majesty's Limner. Sir Allan received the 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,' and in his later years he essayed some very laborious task, the 'Battle of Preston Pans,' 'Nelson Boarding the San Nicolas,' and the 'Battle of 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 his reputation.
follow the same profession. Having completed his education at St. Paul's school, he for a time practised as an usher in the college. He was a good hand at the violin, and returned to London in the hope of maintaining himself by his pencil. While acquiring the technicalities of his art he was often reduced to great straits. At first he was con-
strained to paint signs and transparents for blind-makers; and afterwards he became an assistant in the works of a firm 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 hand to a more popular branch of art. After working for a while as assistant to Stanfield and others, he obtained the situation of principal scene-painter at the Olympic Theatre, where that establishment first came under the management of Sir John Vanbrugh. As his talents were well known and his vigorous pencil did much to secure the success of the brilliant spectacles which formed the distinguishing feature of the management. Allen's early oil-paintings were gene-

rally 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 hardness of his pictures as being contrary to the usual exhibition of the Royal Academy. He joined himself therefore to the newly-founded Society of British Artists, and became one of its most ardent supporters. All his most important works were thenceforward exhibited in the first instance on its show-room, and naturally became very popular.

Allen did not attain the position his early pictures pro-
mised. 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 Minton describes as affording constant delight to the city dweller. For these Allen had all a Lon-
don's relish, and while he painted them with continual reference to the reality, his pictures commanded the sympathy of his countrymen. His key work was his 'Chapel in the Churchyard,' which had obtained skill in producing those 'brilliant effects,' 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 fell, which has tended to be altogether alien from that of the theatre. From the first establishment of the Art-Union his landscapes won the favour of the prize-holders. Seldom possessing any knowledge of art, their taste is commonly capricious and imitative; and Allen permitted himself to be driven by the pressure of his circumstances to paint more 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.

ALLONBY. [Cumberland.]

ALLOTIN, ALANTOIC ACID. [Chemistry, S. 1.]

ALLOXAN, ALLOXANIC ACID, ALLOXANTIN. [Chemistry, S. 1.]

ALLYLE. [Chemistry, S. 2.]

ALMADINE. [Gamet.]

ALPINA, a genus of plants belonging to the natural order Zingiberaceae. The species have thick fleshy horizontal roots. The stems are numerous and perennial, with lanceolate leaves, having a silt ligulate 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 anther is bent. The fruit is capsular and 3-seeded, with winged seeds.

A. Galanga 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. excilata of

Linnæus, is called Coriandri in British Guiana, and is described by Dr. Hancock as a bitter pungent plant, and which he says is used to a great extent in medicine, diuretic and, in large doses as emetic. [Galanga]

ALTIRINCH. [Chem.]

ALUMINA. [Chemistry, S. 1.]

ALUMINUM. [Chemistry, S. 2.]

ALDAMIYAH. [Mesopotamia.]

ALDAMIYAH 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 Ghara river. The northern range of Ghara is the more southern range called Ghara is high, well-wooded, and in parts precipitous and very difficult of access. It separates the Amadiyah district from the country of the mountain Kurds. The northern range, which is also well wooded but does not seem to be so high as the southern, forms the plain of Amadiyah from the extensive valley of Berwari.

The plain of Amadiyah is cut up into innumerable ravines by the torrents which rush down the mountains into the Ghara River, by which they are carried to the Zab. It is well wooded with the gall-bear oak and with 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 in-
digenous population owing to the oppression of the tyranny of their Turkish governors; most of those who 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 among the products. Kurdistan and Turkish ob-
presure afford little encouragement to cultivate the land.

The town is described by Dr. Layard as a heap of ruins; porches, bazaars, baths, and habitations were laid open to their utmost recesses; every part seemed crumbling to ruin, dilapidated, and nearly deserted; for the population at the time of his visit, in August, had retired to their summer habita-
tions in the mountain valleys. The fort or castle, which is surrounded by walls flanked with towers, is considered of great antiquity. The town was defended by a small garrison. Amadiyah was formerly a place of con-
siderable importance and strength, and contained a very large and flourishing population. It was governed by hereditary pashas, who traced their descent from the Abbas-
cide Caliphs, and were on that account always regarded with religious respect by the Kurds. The ladies of their family enjoyed the title of Khan. Ismaiil Pasha, the last of these hereditary chiefs defended himself long against the Turks, who attacked him at his residence, surrounded by a wall, and after a long and obstinate resistance, took the place by assault. Amadiyah (which is said to mean 'Town of the Medes') is frequently mentioned by early Arab geographers and is considered to have had as its foundation, most probably dates from a very early epoch. Some have asserted that it was called Ecbalana. To a defaced bas-relief on the rock near the northern gate, Dr. Layard assigns the date of the Assaric 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 osaalis, or sheds made with boughs. The population has greatly diminished since the place became subject to the Turks.

(Dr. Layard's Nineveh and its Remains; Colonel Chesney's Expedition to the Euphrates and Tigris.)

AMALFI. The story of the discovery of a copy of the Pandecta at the siege of this place, a. d. 1137, is now con-
sidered entirely without foundation. (Savigny's Geschicht der Römischen Recht im Mittelalter, Heidelberg, 1851-53, 6 vols. 8vo.)

AMAND, Sr. [Chem.]

AMBLESE [Wustmoreland.]

AMELANCHIER (the Savvy name of the Medlar), a genus of plants belonging to the sub-order Pomeae (Pomacea, Lindley), of the order Rosaceae. It has a 5-cleft calyx with lanceolate petals, and an ovary of 10 cells, with a solitary ovule in each cell. The species are small trees, with simple serrated deciduous leaves, and racemes of white flowers.

A. vulgaris, the common species, is a native of rugged places throughout Europe. It is the Aconidium rotundifolium of Persoon.

A. Betyipium, the grape-pear or Canadian Medlar, is a
the best route for a railway from the Mississippi to the Pacific between the parallels of 38° and 48°. These expeditions, organized by the United States government, led by experienced and skilled leaders, have contributed very largely to American geog-

graphy, observations having been made from the Mississippi to the Pacific, between the parallels of 49° and 47°, 41° and 39°, and near the 40°, 35°, and 34°, touching upon the Pacific Ocean at Puget Sound, Sacramento, 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 from a railroad from the Mississippi River to the Pacific Ocean."

In British North America, an extensive region, including at least 119,000 square miles, remains almost completely unexplored. This region extends from the head-waters of the Saskatchewan River, and the foot of the Rocky Mountain range, 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 exploration 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 pur-
poses of this expedition the Lords of the Treasury, on the recommendation of the Secretary for the Colonies, have sanctioned the abilities of Lieutenant James Palliser, of the Royal Artillery, Mr. Bourgeau a botanist, and Dr. Hector a medical gentleman, have been associated with Mr. Palliser. The chief objects of exploration are to be, 1, the exploration of the water-parting between the plains of the Saskatchewan and the basin of the south branch of the Saskatchewan and its tributaries; 2, the exploration of the Rocky Mountains, for the purpose of ascertaining the most southerly pass across the Pacific; and 3, the exploration of the valleys within the Basin of the North-West Passage, in order 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, taking part in the advance.

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 Río de la Plata, and ascending the Parana and intrepid Orellana three centuries ago; namely, Lienz. Dawe, R.N., in 1828; Dr. Pöppig, in 1831; and Lieut. Smith, R.N., in 1834. Of these travellers Pöppig added most to our geographical knowledge. He went first to Chili, where he spent two years investigating the adjoining regions, and sailed to Lima, whence he ascended the high table-land of Peru, and descended thence by the eastern declivity of the Andes to the valley of the Huancay or Huallaga, where he remained nearly two years, during which he collected a great deal of information respecting the climate, productions, and geography of that country. From the Huallaga he passed down the river Marañon, and thence returned to Europe, after five years (1837 to 1838) of wandering in the wilde of the New World, laden with 17,000 specimens of dried plants, some hundred stuffed animals, many plants before unknown, 3000 descriptions of plants, and many sketches. His work is a most valuable addition to our knowledge of South America.

Nearly simultaneously, namely from 1826 to 1833, another extensive journey was accomplished by Alcide d'Ori-

bigny, who travelled through the Bandas Oriental, Patagonia, La Plata, Chili, Peru, and Bolivia, and published a very full account with many important observations.

More important still are 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 the Admiralty furnished the Surveyors with geographical information than any expedition since the 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 1835 to 1844 Sir Robert Schomburgk ex-
plor British Guyana and the country to the west as far as
the Orinoco and Casiquiare. In reaching the Upper Orinoco he was enabled to connect his observations with those of Humboldt, and to add to the series of facts, astronomically determined, along a line extending from the Atlantic to the Pacific. One of the most interesting of his discoveries is that of the water-lying named Victoria Regia, the most beautiful specimen of the flora of the Amazonas and its tributaries, which has so 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 Codazzi, by order of the government of that country, has completed a survey, which is 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 Amazonas, and visited by an English naturalist Weddell, has since explored the little-known regions between the upper course of the Plata and the Peruvian table-lands.

W. Bollanger and G. Smith, who since 1826 had been residing for a considerable time in the province of Tarapaca, Peru, have made us acquainted with a very remarkable region of South America, a full account of which was published in 1851 by Mr. Bollanger. In it he gives us the most remarkable facts about the 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 22,000 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 1869, of which a second edition, much enlarged, appeared early in 1858; and the French traveller Casteline, accompanied by the English naturalist Weddell, has since explored the little-known regions between the upper course of the Plata and the Peruvian table-lands.

"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 when 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 survey of 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 this coast survey.

Since the publication of the article America many political changes have taken place in the governments of North and South America. The present names of the various states, with their capitals, and capital town of each, are stated in the following table—which of however some of the figures are only approximations.
ANÆSTHETICS. [Materia Médica, S. 2.]

ANAPA, a sea-port town and fortress of Russian Circassia, situated on the eastern shore of the Black Sea, in 44° 28' N. lat., and 32° 15' E. long., is about 25 miles S.S.W. from the mouth of the Cuban; population, exclusive of the garrison, about 300. It was founded by the Turks in 1784, to protect their Tartar subjects on the left bank of the Kuban, as also to extend their influence over the Circassian tribes. The products of Circassia soon began to circulate through Anapa, as they did formerly through Taman, which was then recently occupied by the Russians. There is no harbour, but only a roadstead at Anapa. The imports are cotton and woolen goods, tobacco, and a few exports; viz. ex., buffalo, and cow hides; hare skins, fur; tallow, wax, &c.

The fortress of Anapa is built on a projecting crag, on 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 towards the sea are 432 yards long, and the entire circumference exceeds 2 miles. To the south-west the walls are built upon a calcareous rock; those on the north and north-west are on a bed of sandstone. At certain points the wall is strengthened by bastions and turrets. In the corner of the north-western bastion is a small fortress, called the Bastion of St. John. The whole circuit is about 5,000 yards, and with the ditches about 1,500 yards in circumference. There is a well within the walls, a cistern, and a pond in the bay. The water is clear and sweet, and the soil is fertile. The chief products are wheat, barley, and corn. The town has about 300 houses, and the population is about 3,000. The town is well defended, and is a strong place of refuge in case of attack.

ANCUn, a delegation or province in the States of the Church, is bounded N. and W. by the province of Urbino, S. by the Adriatic Sea, and E. by the Province of Piacenza. 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. Of the rivers which are small, the principal are—the Misa, the lower part of which is in the province of Urbino—Pesarzo, and enters the sea at Sinigaglia; the Eino, which has its source in the province of Macerata; and the Pescara, which marks the boundary between this province and that of Macerata. Of the whole area of the province (380,904 acres), 103,016 acres are under cultivation; 65,780 acres are covered with plantations and copses, and the rest consists of olive-grounds, meadows, vineyards, forests, and uncultivated land. The amount of absolutely barren land is only 20 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 sheep.

The province comprises the northern part of ancient Picenum, with a small portion of Umbria; these two provinces were separated by the Enea, now the Eino, which is the ancient river by which Latinus passed to Picenum, and was therefore the western 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 ducy of Urbino on the north, to the Marches of Fermo on the south. The capital is Ancona. The other towns which require notice here are Jesi and Osimo.

Osimo, the ancient Autunium, 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 43° 29' 30" N. lat., and 13° 27' 30" E. long., with a population of about 1,500. It is a healthy and well built place, with a cathedral dedicated to St. Tecla; a town-house containing a museum of ancient statues and inscriptions found in the neighborhood; a handsome episcopal palace; and several convents. Silk and woolen hosiery are manufactured. The population is about 8,000.

ANCUS, the GULF OF, extends between the mainland of South America and the island of Chiloé, from 41° 30' to 43° 30' S. lat., and from 72° 40' to 73° 40' W. long. It communicates with the Pacific Ocean by the Narrows of Chacao, which are of considerable depth, but at some places hardly a mile wide. On the south of the island of Chiloé it is connected with the Pacific by the wide opening which occurs between the Chonos Archipelago and the island, which is about 160 miles wide, but at some places scarcely a mile. The narrowest part, which is near the island, is nearly 160 miles long (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.
In the middle of the gulf, between 42° 10' and 43° 50' is a great number of high rocky islands and islets. The southern point of the Bay of Ancud is in some maps named the Gulf of Corevados. (Surroving Voyages of the Adventure and Beagle.)

ANGLER, HENRY WILLIAM PAGET, MARQUIS OF, eldest son of Henry, first Earl of Uxbridge, was born May 28, 1788, educated at Harrow and Christchurch, Oxford; and entered Parliament as member for the Caermarvon 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 out to join his father's forces. He marched 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 in 1793. At the same time he received the corresponding preferment in the army, the lieutenant-colonnel's commission bearing date September 12, 1793. In 1794 he joined the army of the Duke of York in Flanders, and greatly distinguished himself during the remainder of that campaign.

On his return to England, Lord Paget was 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 in 1795, and distinguished himself in a 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 occurred again, a signal advantage over an apparently larger force under General Simon. From this time he retained his home actively on the officer under whose cover he remained. He had been appointed Governor of Gibraltar, and was sent to 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—this being his first official service in the English service of 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 150 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, and whenever the infantry and artillery could not be relied upon 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 Captain Wall to charge the Imperial Guard, who had crossed the stream. The French Guard gave way, and the Duke of Wellington was afterwards awarded a considerable loss in killed, wounded, and prisoners, among the latter being General Lefebvre Desouzettes, 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 fortunes 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 Argylly, 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 the ease with which he was re-established, 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 the service excited general admiration. At the battle of Waterloo his gallantry on horseback, the conspicuousness of the almost unqualified gallantry of which that field was the theatre. It was the final charge of the British brigade, led by the earl, that destroyed the famous French Guard, and with it he overthrew 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 fragments of the bone were afterwards collected, with an inscription commemorating the circumstance, which is always one of the objects shown to visitors at Waterloo. The service rendered by the earl at Waterloo was generally recognised and duly rewarded. Immediately the despatches of the commander-in-chief, the Duke of Wellington, came to light, 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 knighthood dignities. In 1818 he was elevated to the peerage of Anglesey, and in 1819 he attained the full rank of general; at the coronation of George IV. he held the office of Lord High Steward of England; and in 1820 he received the sinecure office of Captain of Cowes Castle.

After fifteen years of comparative inactivity 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 temperance, won a remarkable share of popularity. But his ardour outran his discretion. He had already in conversation declared himself a confirmed Catholic, and was found to be inconvenient; and when, in December 1826, he wrote a letter to the Roman Catholic primate directly favourable to Roman Catholic emancipation, he was at once recalled to England. Thus he was removed from Dublin as a day of mourning; the shops were closed, 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 had done much to bring about. In November, 1830, the Marquis of Anglesey was restored to his vice-regal office. But his popularity did not return to him. He set his face against the proceedings of O'Connell, and his former services were forgotten. A bill passed the English parliament to object for securing the public peace in Ireland led to great dissatisfaction: misunderstandings and recriminations occurred between O'Connell, who declared himself tricked, and the ministry, and in consequence Earl Grey resigned July, 1833; and with him the Marquis of Anglesey, who was regarded 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 clamours against his name, there can be no doubt. That he displayed 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 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 Master-General 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 1846. 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 the father of the late Earl of Uxbridge, and as lord-lieutenant of Anglesey, by his eldest son the present marquis.

ANGOUVLÉ, DUC ET DUCHESSÉ D'. Louis Antoine de Bourbon, Duc d'Angoulême, and afterwards Dauphin of France, the son of the Comte d'Artois (afterwards king by the name of Charles X), was born at Versailles on the 6th of August, 1775, and died at Goëritz 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 had been made to him, passed to England, followed by 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 command in Germany, but attained no distinction. The success of this campaign induced him to return to a state
In 1814, when the Bourbon family returned to Paris, the Duke and Duchesse d'Angoulème took the ancient title of Dauphin. The decrees of the 29th of July, 1830, re-opened the road which was for the third time to conduct the royal family to the land of exile. They arrived in England on the 23rd of August, and were received as private individuals. Charles X. asked and obtained leave to take up his abode, when in Edinburgh, in Holyrood Palace.

They soon after removed to the continent, and fixed their residence at Göttingen, in Hanover. The duchess survived her husband seven years.

ANILINE. [CHEMISTRY, S. 2.]
ANISOINE. [CHEMISTRY, S. 2.]
ANISOLE. [CHEMISTRY, S. 2.]
ANISTYLANE. [CHEMISTRY, S. 2.]
ANNEXATION of the Kars district of Turkestan. Armenia, is situate on the right bank of the Araxes, a feeder of the Euphrates, in 40° 25' N. lat., 43° 34' E. long., at a distance of about 65 miles N.W. from Erivan. It was finally ceded to Russia, in 1828, which was the residence of the Armenian kings from the 8th century till the year 1084, when it was taken and ravaged by the Alp Arman. The Armenian patriarchs also resided in Anni from 993 to 1084. The town stood upon an area terminating on two sides in abrupt and rocky declivities; on the south is a deep ravine, in the bottom of which the Arpa flows: the area is open towards the north, on which side it is defended by a massive wall flanked with numerous towers. The towers are remarkable for the gigantic stones formed by huge blocks of red sandstone set 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 of the city itself, there are some, of the buildings of the church, for the few existing churches. All the public buildings display much splendour 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 also some of the buildings which are made of brick, but some are Turkish. The private houses of Annı 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 exist in a poor state of repairs, till 1818, when it was completely destroyed by an earthquake. (Wilbraham's Travels in the Trans-Caucasian Provinces of Russia.)

ANNUITY. The restrictions imposed on contracts for annuities by the Statute 13 Geo. III, c. 141, have been removed, and parties are now left perfectly free to make their bargains in the terms on which they can agree. (17 and 18 Vict. c. 90.)

ANOPHILA, a family of insects, including the Apterae, a tribe of Aphides, and various forms of Juncius (Poneraeus) and Parasitic Insects of other authors. The researches which were commenced on this family by Dr. Leach have been carried on by Mr. Denny, and resulted in the discovery of a vast number of new forms. The result is that it has been found that the expression of a certain natural order for a useful purpose is accompanied by one, or more creatures belonging to this family, having a peculiar form in each species. Nearly 600 different forms of these curious insects, all formed in a manner which is described in the catalogue of the species which at present exist in the British Museum. In most cases but one species of the parasitic exists on one species of animal, but there are instances, as in the galls and galls of the several kinds in which a species of the bird is attacked by five species of Anophila. The best series of illustrations of these insects which exist are contained in Denny's 'Anophila Britannica,' published in 1842.

ANTARCTIC REGIONS. [POLAR COUNTRIES AND SEAS, S. 2.]
ANTHERIDIA, in Botany, organs found in many of the tribes of Cryptogamic or Flowerless Plants. They have been observed in the Characeae, Horse-Tails, Ferns, Mosses, and Algae, and are described by Kerner as the Phanerogamic or Flowering Plants. In the cells of which they are composed certain moving filaments are observed, which have received the name of Phytophors or Spermatozoids. Many of these phytors move by cilia attached to their length. For this reason to be inhabited till a.d. 1528, and forms, see REPRODUCTION in PLANTS and ANIMALS, S. 2.

ANTHRISCUS, a genus of plants belonging to the natural order Umbellifere and the tribe Scandineae. It is known by possessing little or no calyx, with heart-shaped petals bent down at the point; a fruit narrowed below the short beak, and without any ridges. The beak has five ridges.

A. syvustris, Wild Chervil, is known by its terminal stalked umbels, and its linear glabrous fruit with a short beak. It is a common weed in hedges and banks throughout Europe.

A. Ceratothion (Scandis Ceratothion), the Garden Chervil, is probably an escape from cultivation in England. It is common enough in waste places. [SCANDRIS.]

A. vulpigerus has the umbels lateral and stalked, and an ovoate hispid point. The leaves are slightly hairy. It is common in the waste places of Great Britain. (Babington's Manual of British Botany.)

ANTHROPOLIT the name given to Human Fossil Remains. Although at the same 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 has been false. Daubenton first demonstrated that these bones had long been lost. All that remains of a gigantic human being belonged to a lower 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 ('Brigewater Treatise') remarks that frequent discoveries have been made of human bones and remains, associated with cave-dwellings, in the caves of 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 subsequent inhabitants of a region often continue 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, affording no proof of the time when the bodies were introduced. Many of the 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 within the caves of France and in the province of Liège, which are described as being of the same antiquity with the bones of hymen and other extinct quadrupeds that accompany them. Most of these may probably admit of explanation with respect to the caves just enumerated. In the case of caverns which form the channels of subterranean rivers, or which are subject to occasional inundations, another cause of admixture of human bones with the remains of animals of more ancient date may be found in the burials of such rivers by races of people.'

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 Guadalupe, adding that there is however no reason to consider these bones to be of high antiquity, as the whole of the rock 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 ondiment by the union of similar materials, on the shores of tropical seas. ('Brigewater Treatise', vol. i.)

One of these skeletons, described by Mr. König (Phil. Trans., 1814) is in the British Museum. See further as to the rock in which the skeletons are imbedded, 'Linn. Trans.,' 1816, vol. xii.

Dr. Lund published, some years ago, the discovery of human remains with those of Megatherium, &c.; and he was of opinion that the former were of the same epoch as those of the latter, and imbedded, he supposed, in the pebbles.

ANTIGORIN. [Chemistry, § 1.]

ANTOMMARCHI, FRANCESCO, a surgeon of some reputation as an anatomist, but more likely to be remembered in connection with his appointment to the Chair of Anatomy at the University of Bologna. In 1885 he received the degree of Doctor of Law, and in 1886 he was appointed Professor of Anatomy at the University of Bologna. He was a native of Corsica, studied medicine at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna.

In 1885 he was appointed Professor of Anatomy at the University of Bologna, and was later appointed Professor of Anatomy at the University of Bologna. He was a native of Corsica, studied medicine at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna.

His appointment rendered him the ablest assistant of his anatomical teacher, Mascagni. In 1888 he was appointed Professor of Anatomy at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna. He was a native of Corsica, studied medicine at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna.

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His appointment rendered him the ablest assistant of his anatomical teacher, Mascagni. In 1888 he was appointed Professor of Anatomy at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna. He was a native of Corsica, studied medicine at the University of Bologna, and was afterwards appointed Professor of Anatomy at the University of Bologna.

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APPERLEY, CHARLES JAMES, a writer on sporting subjects of considerable reputation, better known by the initials C.J.A., was born in 1822 at St. Peter's Village, near Wigan, son of Rev. Michael Apperley, a Welsh country gentleman, and was born at his father's seat of Pilsgronem, in Denbigshire, 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 Bolton Hall, once the country seat of Addison, in Warwickshire. Here he devoted himself so entirely to the chase that for some years his only business was to be in pursuit of the fox, which was forty miles to distant cover, and he contrived to defy 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 hound was not so intimate as his, and who therefore could not find out their sport. He purchased the grounds of an untried animal. In 1831 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 sporting periodicals, especially to the Sporting Times, attracted so much attention that the circulation of the weekly paper 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 foxhounds. In 1833 he was appointed 'Hunting Tour,' which led to a suit by his representatives for advanced purchase, the result of which was that, to avoid a prison at home, Nimrod was compelled to take up his residence in France. In
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 small glass vessels for exhibition by the daily supply of fresh-water, the discoveries 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 absolute balance which can be maintained in the water between the oxygen 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 the plants, and carbonic acid, 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 earth, 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 in water, 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 in a small scale as is shown in an aquarium, is very productive.

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 sufficient to have simply any kind of plants and animals; but that, in order to maintain the balance correctly, it was necessary that certain animals which lived on decomposing vegetable matter should be present. At certain seasons of the year this decomposing matter from the water-plants becomes so decided that the water would be rendered impure if this decomposition was not arrested. The cure for this was found in the addition of Fresh-Water Mollusca to the jars containing such substances as the golden-carp and stickback. Among the water-plants, the Valisneria, Callitriche, &c. The best kind of snails for this purpose are the various species of Planorba. Not only is it necessary that this latter precaution be taken to ensure the success of the experiment, but it is of importance to guard against the preponderance of animal life. Although in most cases it appears that there cannot be too many plants for the health of the animal as long as they grow healthily and do not decompose, yet it often happens that the excess of animals over plants in a jar will destroy the balance, and lead to the destruction of life.

Amongst the fresh-water plants adapted for growing in the Aquarium are the Valisneria spiralis, the various species of Chara, Anacystis, Aulacodictyon, Stichococcus, Alocha, Cottiae, Callitriche autumnalis, C. cornuta, Myriophyllum spicatum, and Ranunculus aquatilis. Such jars afford a good opportunity for cultivating the various species of fresh-water Conferve, which all assist in keeping the water pure.

Although these results have been known for many years, it is only recently that any attempts have been made to carry out the same plan with regard to marine animals and plants in sea-water. The difficulties, however, are greater in maintaining the balance between the plants and animals in sea-water than in fresh. This arises from the more arduous life, both of marine plants and animals, and the greater amount of disorganised matter which they throw from their surfaces. By care in the selection of sea-weeds, avoiding those which are large and throw off much sand from their surface, and not overcrowding the water with animal life, jars or tanks containing sea-animals and sea-plants can be easily managed. Mr. Warington recommends green sea-weeds, such as the species of Porphyra, &c. Mr. Gosse speaks favourably of the bubble, the Delisea, and the Delesseria. In jars or tanks containing these plants, various forms of sea-animals have been successfully kept for many months.

The greatest experiment of this kind which has hitherto been attempted is in a large glass-building that has been erected in the gardens of the Zoological Society, Regent's Park. It was opened to the public in May, 1853. This building contains an area of 60 feet by 25 feet. The sides
of this parallelogram are bounded by reservoirs of plate-glass, each being about 6 feet in length, and 2 feet 6 inches in depth. The depth of about 3 feet from the ground, so that each division presents as it were a sub-marine picture 'on the line,' and may be approached so closely that the minutest animals not microscopic, may be watched with the naked eye. The perfect success under circumstances which differ as little as possible from those 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, but with the great advantage to the observer that instead of 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 also most effective in throwing a perfect picture through perfectly transparent walls, 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, &c. Some of the larger forms of fresh-water crustaceans, as the Crawfish, have also been introduced. With these have been placed a large variety of the fresh-water Mollusca, belonging to the genera Linneus, Planktus, Anodon, Unio, &c. These tanks have been occupied since Christmas, 1852, with scarcely any loss. Amongst the Radiate Animals, more remarkable to an observer fond of poetic description than the inhabitants of the tanks for causing the destruction than the Actinidea, and all experimenters agree that they are amongst the animals which may be most successfully kept in the Marine Aquarium. All the more common British species are now to be seen in the Regent's Park, and some of remarkable size and beauty. The Sertularian Zoophytes and the Polypoza are also there, but their animal inhabitants are too minute to be seen with the naked eye. Specimens of the Echinodermata, including several forms of Star-Fishes (Asterias), the Sea-Squirt (Ciona), the Sea-Urchin (Echinus), and 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 Pinne, the Oyster, the Pecten, the Cockle, amongst bivalves; and the Whelk, the Periwinkle, with many other univalves, have demonstrated how large a field of observation is in store for those who shall labour amongst the innumerable species of the shells of the sea. The Nautilus has been brought back; and we may hope for the day on which the Antiquary may be able to publish a work on this subject.

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 ocean, and only reward the labours of the dredger, yet they live perfectly well in the shallow lodgings provided for them by the Zoological Society. These facts demonstrate that amongst the Invertebrate tribes there is none whose habits may not be studied in the Aquarium.

With regard to fish it is found that those which live in shallow water thrive best in the Aquarium. The Cormorant (Cormophorus), the Fifteen-spined Stickleback, the Long-spined Cottas, two species of Blenny, the Goby, the Grey Mullow, and the Flat Fish have lived remarkably well.

(Athenism, May 29, 1853; Annales of Natural History, May, 1853; Goss, A Naturalist's Rambles on the Devonshire Coast; Daljeyy, Remarkable Animals of Scotland; Lancaster, The Aquarivarium.)

AQUARIUM COMING ON.

ARABOIR, a town of Asia Minor, in the pashalik of Sivas, is situated on an elevated plateau between the Göl-Dagh and Sari-Chi-Chak branches of the Anti-Taurus [Antarirus]; at a distance of 16 miles N.W. from the junction of the Kara-Su and Murud-Su, on the caravan route from Aleppo to Trebizond, from which place respectively it is distant 270 and 186 miles. It is built amidst a forest of fruit-trees among which the White Mulberry is most common. The fruit of the mulberry is eaten fresh, and is said to be very disgusting, or it is made into a sweetmeat called Petmes, which is common all through Armenia. The soil in the neighbourhood where it is free from rocks yields fine crops of wheat. The town contains 4800 Turkish and 1200 Armenian families. A few years ago the Armenian population had 1000 hand-looms at work, weaving cotton goods from British yarn. This industry and the caravans trade rendered Arbog a thriving and populous town. Being highly baronial, iron-ore is abundant; and near the spot where the above-named two rivers meet and form the Euphrates, are the lead and copper-mines of Kaben-Maden. (Royal Geographical Society.)

ARAGO, FRANCOIS JEAN DOMINIQUE, was born in the commune of Estagel, near Perpignan, province of Roussillon (now the department of the Eastern Pyrenees), on the 20th of February, 1796. His father, a licentiate in law, supported a numerous family on the income derived from a small landed property. François, the son, 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 passion for physical science. He was driven from home 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 into the village after a battle, and was only saved from a sabre-stroke by a pair of peasant lancers, who rushed on the young boy armed with hay-forks. His father having been appointed Treasurer of the Mint in Perpignan, the family removed to that town, where the boy entered as out-door pupil at the municipal college, and pursuing his literary studies, made himself acquainted with the classical authors of his native country. But walking one day on the ramps, a little incident occurred that confirmed his military inclinations. Seeing a youthful officer directing the repairs of the fortifications, Arago was so much impressed by the talk he overheard by what means it had been won, 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 abbé who taught mathematics. The climate is cold in the winter months, and the young man who was telling him of the difficulties he met with in his studies: 'Keep on, sir, keep on, and conviction will come to you'; which was for me a ray of light. Instead of trying obstinately to comprehend at first sight the propositions that came before me, I kept on, and was astonished the next day at understanding perfectly that which, the evening before, had appeared to me wrapped in thick clouds.

Eighteen months Arago was ready for his examination, 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 languages that his having been a student at those establishments was essential to an officer. In the summer of 1803 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, where a few months later he was appointed from an examination by Legendre as from that at Toulousse. In either case, his readiness and familiarity with the subjects required, overcame the prejudices of the examiners.

He was studying for the artillery branch of the service when, in 1804, the 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 commissioned, of course, to the Academy. One of these, a subject of a paper presented to the Academy of Sciences, and printed in their 'Mémoires' for 1806. In the same year the two young men were appointed by the government to extend and complete the measurement of the arc of the meridian from Dunkirk to Perpignan, a work which Delambre and Méchard had interrupted by the death of the latter. It was now to be extended from Barcelona to the Balearic Isles, and from thence to Formentera, by an irregular triangle, the measurement of which had been thought impossible. The fatigue 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 Deserto de las Palmas, watching for the light set up on Ivisa, owing to a defect in the mirror, was seldom visible. A space of about seventy-five square miles was all the ground he had for exercise; and two Carthusian monks, who, forgetting their vow of silence, used to ascend the mountain to converse with him in the depth of the night. The work involved 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 nightly guard to the workmen.

The geodesic union from the mainland to Ibiza, and thence to Formentera—an arc of parallel of one degree and a half in one triangle—was successfully accomplished. Biot had returned to Paris, where, under the influence of the society, Arago was denounced as a spy. To escape the threatened violence, he obtained permission from the godfather to imprison himself in the castle of Belver. Having a safety-pass from the English Ambassador, 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 Rosas. 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, so great that he thought that his mother might then be looking up at their peaks, anxious for her son.

Being liberated on demand of the day, he sailed once more for France on September 38, and was off the port of Marseille when it was captured, caught by the mists, was drifted all across the Mediterranean to the coast of Africa. Arago landed at Boisie, and having travelled to Algiers, found a new day in power, who would have sent him to the galley but for a personal 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 on a perturbed sea, writing down in the midst of all disasters a narrative, interesting as a romance, in his 'L'histoire de ma Jeunesse.'

While yet in the lazaretto, he received a letter from Francis—the commencement of a lasting friendship with the statesman. Tenderly attached to his mother, his first visit was to her at Perpignan. She had mourned him as dead.

Arago hastened to Paris to communicate his observations to the Academy. Though under twenty-three years of age, he had already gained reputation by his labours and misfortunes; and the death of Lalande having left a vacancy in the Academy, he was elected a member by 47 out of 50 votes on the 17th of September 1809, by a majority of 36 votes, this being the Emperor. Thereafter Arago's influence was felt in the learned body; and his opposition to unworthy candidates brought him at times into collision with some of the most weighty 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 of Malus, he read a paper to the Academy in which he showed that the 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 dispersion, of reflection and refraction, were examined, and in a way that laid the foundation of the science of plane polarised and optics known as 'chromatic polarisation'; and the interesting fact was first announced, that 'while the light from a clouded sky undergoes no modification, that reflected from the sky in motion is always polarised, the intensity of the polarisation varying with the hour of the day and the position of the point with respect to the sun.'

In 1812, authorised by the Bureau des Longitudes, Arago commenced that course of lectures on astronomy and kindred subjects which he continued up to 1846 with the most brilliant success. The high and the low thronged to hear him; the learned to catch his animated manner and lucid style—the many to be charmed. As the Emperor Napoleon III. said, when a native at Ham, 'It is in a high degree those two faculties so difficult to meet with in the same man—that of being the grand-priest of science, and of being able to initiate the vulgar into its mysteries.'

The effect was heightened by the tall commanding form of the lecturer, his great voice, his solemn manner, his dark piercing eyes, shaded by thick bushy brows.

Conjointly with Gay-Lussac, Arago established the 'Annales de Chimie et de Physique' in 1816—a serial still published, and much valued by scientific men. In the same year he announced the result of his experiment, demonstrating the truth of the undulatory theory of light over the rival theory of vision. Young had shown in his experiments that the interference of an opaque screen in the path of a ray under certain circumstances produced the formation of fringes. Arago found that the ray was only retarded, and that by a modification of the apparatus the fringes were still discernible.

In 1816, also, Arago for the first time visited England, where he made the most brilliant of Young and other eminent men of science. With a Frenchman's feeling, he had a painful dislike to hear any allusion to the battle of Waterloo; and while in London he positively refused an invitation to see Waterloo Bridge. His entertainers adopted the stratagem of proposing an excursion on the Thames, which, being accepted, the party descended the river admiring the prospect, and presently coming to the imposing structure of granite then stretching fresh and new from side to side, the party stopped, and a French voice was heard saying, 'Give me the trick, and replied—"Your bridge has at least an arch too many; and that one, to be in its place, should be transported to Berlin.'

Another task commenced by Arago in 1818, again in connexion with Biot, was the construction of the French arch with the English arc by a system of signals and measurements from one side of the channel to the other. The results, together with those of the Spanish triangulation, were placed by order of the Bureau des Longitudes, in a volume entitled 'Recueil d'Observations Géodésiques Astronomiques, et Physiques.' In 1819, jointly with Fresnel, Arago published a series of experiments on the action exercised by polarised rays on each other, singularly interesting. This was the first test in which the complete theory of the refracting powers of bodies no longer existing was proved. Space fails here to give the details; but it was by means of these experiments that Fresnel was enabled to give a complete explanation of the production of colours in crystalline plates, which had been referred by Young to the interference of transmitted rays. The experiments, the results of which had been produced happy results; for Arago, though rich in inventive faculty, lacked the perseverence which works out to its ultimate consequences. "We complete one another," he says, "we have to point out the difficulty, and Fresnel how to conquer it."

In 1809 Arago took up a new line of inquiry. Having witnessed a demonstration of Oersted's discovery at Geneva, he repeated it before the Academy, and with further results. The Danish philosophers, thinking of passing along a wire would deflect a magnetic needle: Arago found that non-magnetic substances were equally affected; that bars of iron and steel became temporary magnets, and lost their magnetism with the cessation of the
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 published. Arago showed that a magnet not magnetic in position exert a powerful influence on the magnetic needle, particularly when in movement. Such metals appeared to become magnetic by mechanical motion—a phenomenon which has been referred by Faraday to general laws of magnetic induction.

In 1829 Arago was chosen a member of the Bureau des Longitudes, and from 1834 till his death the "Annales," published by the board, contained a notice on some scientific subjects. In this period he published, "They never always be repurposed," says M. Combes, president of the academy, "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 "sketches" 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 they are not a mere sketch, and often a full expression of his felicity 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 synchronous perturbations of the magnetic needle at places wide apart, by observations carried on simultaneously with Kupffer at Kasaan—and the suggestion of a decisive proof of the truth of the undulatory theory, which has since been demonstrated by Foucault—besides other subjects of poetry and astronomy.

The later years of Arago's life were passed amid much bodily suffering, when, with falling 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 concourse of 3000 persons to the grave, where Flourens pronounced the oration.

Arago was elected a foreign member of the Royal Society in 1818. In 1822 their Copley medal was awarded to him for his "discovery of the magnetic properties of substances not containing iron"; and their Rumford medal in 1850, for his "experimental investigations of the law of 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 1810, leaving two sons, who still survive. He had been accused of hoarding up wealth, but he left no other fortune to his relatives than a name and reputation of which they may be justly proud. His high works are easily accessible, as they have been collected and published in a series of octavo volumes in French and English. It is a matter 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.

In 1860 Arago was an impromptu 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 election to the Chamber of Deputies after the '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 works were composed in half a century. To Menon, of Tremolieres, 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 despaired 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 political philosopher. "A special exception," so wrote the minister authorised by the Prince-President, "would be made in favor of a philosopher whose labours had rendered France illustrious, and whose existence the government would be loth to sadden."

ARAGUAYA, 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 not unclaimed, except at a few isolated places. It divides the province of Goyaz, which lies east of it, from Matto Grosso, which extends west of its course. It rises in the Serra de Santa Martha, south of 18° S. l., in a lake, and runs under the name of Cayapo about 160 miles, single it unites with Rio Claro, which traverses the town of Villas Boas, the capital of Goyaz, and takes the name of Araguaya. Continuing in a northern direction to about 12° 30' S. l., the river divides into two branches, which do not re-unit until 9° 30'. The island which is thus formed is called Ilha de Santa Anna, or Bannanal. It is more than 200 miles long, and at an average 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 Araguaya, whilst the eastern is called Furo. The latter is most used by the boatais and Creix from the 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. l., 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. l., among which the Vermelho and Ceix from the Pará, and the Rio das Mortes and San John from the left, are the largest. (Henderson's History of Brazil.)

ARANIDE, the first family of the first order of the class Arachnida. [Arachnida.] They are also called Spring Arachnida, from their peculiar long filamcntous cords with which they form their nets and webs. It is to this family that the term Spider is more especially applied; and scientifically it embraces all those creatures which are commonly called Spiders. All these are embraced under the old Linnean genus Araneus. 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, which are directed with the function of reproduction in this family. The frontal claws are terminated by a movable hook which curves downward, and has on its under-side a little slit for the emission of a poisonous fluid which is secreted in a gland of the preceding joint. Thexma-llae 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 body is furnished with four or six nipples, fleshy at the tips, round or conical, jointed, placed close together, and pierced at the extremity with an immense number of minute orifices for the discharge of silken threads, which are produced from matter formed in internal reservoirs. These are called spinnerets. The legs vary in length, but are composed of seven joints, of which the first two form the haunch, the next the femur, the fourth and fifth the tibia, and the two others the tarsi. The last is ordinarily terminated by two claws, generally toothed beneath, and by a third, smaller claw which is not toothed.

The most remarkable function performed by the spinneret is that of producing silken threads by means of the spinnerets before described and figured. From each one of the minute orifices of the spinneret there exude as many little drops of a liquid, which becoming dry in motion occurs in contact with the air, forms so many delicate threads. Immediately after the filaments have passed out of the pores of the spinneret they unite first together and then with those of the neighbouring spinnerets 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 tenuity that the naked eye cannot detect them till they are formed into a common thread. The spinnerets of the same spider differ in structure, and Lyonet has shown that one set of spinnerets is employed in producing threads which are glutinous, whilst another set produces threads which are smooth. This may be seen by throwing a little dust on a spider's web, such as that of Epeira diadema, 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. These last are also found to be stronger than the spiral ones.

Thus caught offers to treat 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 ariel 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 spinnerets a small quantity of viscid fluid, which is drawn into fine lines by the ascending current of air from below keeps impinging till the animals, 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 spinnerets; but when placed on sprigs 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 addition 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 moveable and extremely sharp hook, 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 removing their webs after they have been broken off. This power, however, is not confined to spiders, as we find it in the Crustacea [CRAUSETA], 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 Araneidae are very numerous and have been arranged by naturalists under several genera. They have been investigated with great care by M. Walckenaer, who has made them the special study of his life, and has drawn up 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 OF THE SUBDIVISION OF THE ARANIDEA OR ARACHNIDA PILOSA, INTO GENERA.

<table>
<thead>
<tr>
<th>Genus</th>
<th>Description</th>
</tr>
</thead>
</table>
|Mygale|...
|Oliotera|...
|Philodromus|...
|Sphodromerus|...
|Dysdera|...
|Segestria|...
|Oxyopes|...
|Sycidae|...
|Lyocosmus|...
|Tegenaria|...
|Hermitia|...
|Sphanius|...
|Dolophantes|...
|Myrmeleto|...
|Erethyes|...
|Platysoma|...
|Aynia|...
|Deleasa|...
|Tasomea|...
|Selenops|...
|Erema|...
|Philodromus|...
|Sparassus|...
|Clathrus|...
|Cribiculus|...
|Uranus|...
|Clotho|...
|Tetragnatha|...
|Laridodes|...
|Pholcus|...
|Aranea|...
|Tegecara|...
|Achelatus|...
|Aeglena|...
|Episin|...
|Epiglottis|...
|Epillon|...
|Uloborus|...
|Zygius|...
|Epiphila|...
|Epiglottis|...
|Theridion|...

**Araneidae**, hiding in holes and fissures.

**Ctenidae**, including themselves in silken tubes.

**Ccelidocara**, sheltering themselves in small cells.

**Cyclococha**, running swiftly to catch their prey.

**Salthotera**, leaping and springing with agility to seize their prey.

**Laterobolus**, walking and running sideways or backwards, occasionally throwing out threads to entrap their prey.

**Nictitela**, going abroad, but making a web for their nests, where the larvae threads to entrap their prey.

**Furcula**, going abroad, but spreading long threads of silk about the places where they prowl in order to entrap their prey.

**Tatarida**, splashing great webs of a close texture like hemlocks, and dwelling therein to catch their prey.

**Orthinidae**, spreading abroad webs of a regular and open texture, either orbicular or spiral, and remaining in the middle or on one side to catch their prey.

**Reticulidae**, splashing webs of an open meshwork and of an irregular form, and remaining in the middle or on one side to catch their prey.

**Neocosa**, swimming in water, and spreading their filaments to entrap their prey.

**Aquaticidae**, living in water.

(Cyclopoidea of Anatomy and Physiology, article *Arachnida*; Blackwall, in Report of British Association, 1844; Owen's Lectures on Comparative Anatomy; Cuvier's Régne Animal; Insect Architecture, in Library of Entertaining Knowledge.)

ARBITRATION. 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 arbiters or umpires, or the refusal of any of the parties to proceed therein, have been remedied by the Common Law Procedure Act, 1854. (Blackstone's Commentaries, Mr. Kerr's ed., vol. iii., p. 17.)

ARCET-TIHY. [TOZOTUS, S. 1.]

ARCHES, 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 suit for subtraction of legacies, (20 & 21 Vict. c. 77 s. 23), or for defamation (18 & 19 Vict. c. 41), can now be entered before this Court, whatever its jurisdiction is confined to few peculiar cases, particularly connected with the Established Church. (Blackst. 'Comm.' Mr. Kerr's ed. vol. iii. p. 93.)

ARCHITECTURE. [PUBLIC BUILDINGS.]

ARCTIC REGIONS. [NORTH-WEST PASSAGE, S. 2.]

ARDEA, ARDEIDÆ. [HERONS.]

ARENIOLA, a genus of Annellids Annellida, referred by Cuvier to the Dorsibranchiate class on account of their external gills. The general structure and habits of the genus determine most naturalists in placing it with the Terricolous Annellida. [ANNELIDA.]
The gills are branched, and placed upon the rings of the middle part of the body only. The mouth is flexely, 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. Pectinurus**, the Leb 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, OVMAC, S. 1.]

ARGUS, a genus of Entomostracous Crustacea, belonging to the section Pectincola. There is but one species of this genus, the *A. foliaceus*. 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 "Loose of the Carp and Danistickle or TrickLack."

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 or disc-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 is parasitic. These suckers
is smooth and polished. They are composed of three distinct membranes, which are super-imposed one upon the other, and are termed by biologists the tunica, the media, and the adventitia, each of these membranes is called a tunic, or coat, and each possesses a peculiar structure, and performs a separate function in the circulation of the blood.

1. The internal tunic consists of a membrane, colourless, nearly transparent, and so firm, that it is impossible for it to resist to press more than any of the others the bursting of the artery by the current of the blood; for if, in a living animal, the other coats be entirely removed, this alone is found capable of sustaining the impetus of the circulation, and of preventing its exhaustion.

2. The middle tunic, called also the fibrous and the muscular, is composed of yellowish fibres, which pass in an oblique direction around the calibre of the vessel, forming the segments of circles which are so joined as to produce complete rings. In the larger trunks, several layers of these fibres can be raised in succession by the forceps, so that this coat is of considerable thickness, and it is proportionally thicker in the small branches than in the large trunks. This coat is firm, solid, and highly elastic. It is the main tunic by which the artery resists dilatation in the transverse direction, which it does so effectually that when the left ventricle of the heart propels a fresh current of blood into the aorta, the tunica and no other part of the vessel is perceptible. The characteristic property of the fibrous coat is its elasticity. If it be mechanically irritated, or if a chemical stimulant, such as ardent spirit or ammonia, be applied to it, the vessel contracts forcibly upon its contents. The contractile power, which is so necessary to the muscular coat, engages the minds of physicians to believe that the fibrous tunic consists of muscular fibres; but careful examination has shown that its organisation possesses nothing in common with that of the muscular tissue, while chemical analysis has demonstrated that it contains no fibrin, which is the basis of most of the muscular coats.

3. The external tunic, called also the cellular, consists of small whitish fibres, very dense and tough, interlaced together in every direction. It is much thicker in the large trunks than in the small branches, the reverse of the fibrous coat. Its outer surface is covered by a loose and flaccid cellular substance, which connects the artery with the surrounding parts, and particularly with the sheath of the vessel. Its firmness and resistance are so great that it is not divided however firmly a ligature may be placed around the artery; and its elasticity, especially in the longitudinal direction is so remarkable that it has been called, by way of eminence, the elastic coat.

Arteries are themselves abundantly supplied with arteries, constituting their nutrient vessels, and called Vasa Vasorum; but these nutrient vessels of the artery form but few anastomoses, that is, few communications with any other arteries. The principal nerves of arteries are derived from the ganglionic or plexiform system, but with these are mingled branches derived from the sensitive or the animal system. [Nerv.] Accordingly, under ordinary circumstances, arteries carry on their functions independently of any influence derived from the brain and spinal cord, but they are capable of being affected by agents applied to those organs.

Among the physical properties of arteries, the most important are their extensibility and their elasticity. Their extensibility is chiefly in the direction of their length. After an artery has been extended, either lengthwise or transversely, it suddenly retracts on itself when the extending force is removed. If the finger be forcibly introduced into the section of a large artery, the sides of the vessel re-act on the finger, and proportionally compress it. If an artery be divided in the dead body, though emptied of its contents, it maintains its cylindrical form, and preserves its capacity unimpaired. The elastic property on which these phenomena depend is common to all the coats, but it is greatest in the external tunica and least in the internal tunic, and it is also much greater in the large trunks than in the small branches.

The most important vital property of the artery is its contractility, that is, its power of diminishing its capacity, or of approximating its parieties, and thus proportionally acting back upon the general circulation. The function of the elasticity is to prevent any of these phenomena above in the larger arteries in any degree; but it resides chiefly in the largest divisions of the arterial branches, that is, the capillary vessels.

[Capillary Vessels.]

ASHURTON, ALEXANDER BARING, BARON, was born October 27, 1774, and was the second son of Sir Francis
Baring, Bart., an eminent merchant in the city of London. He was removed from school at a rather early age, and probably during his apprenticeship in the firm of his father, he 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 afterwards exhibited with spirit and sagacity 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, became the head of the great firm of Baring, Brothers and Co.

Mr. Baring entered Parliament in 1812 as member for Taunton, which town he continued to represent till 1820, when he was returned for Callington, and remained its representative till his death, in 1829. Before the Reform Bill of 1832 was introduced, he was one of the leaders of the Reform party. Prior to the introduction of the Reform Bill Mr. Baring had voted steadily with the whig party; but he warmly opposed that measure, and in future ranked among the supporters of Sir Robert Peel. When the Reform Bill was passed in December, 1834, he acknowledged the advantage which he had derived from the adhesion of his prosectyle, by introducing Mr. Baring into his Cabinet as President of the Board of Trade and Master of the Mint. The appointment was received with considerable surprise; it was generally supposed that Mr. Baring would have been appointed to 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 continued to perform his duties. On the resignation of Lord Ashburton, William Baring was 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 definite 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, on the opening of 1842, felt able to announce 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 to discontinue the duties on tea; and then, 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 acceptation 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 un/questioned 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, and as one of the trustees 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 researches in the south and west. The eastern and central portions of Asia alone, particularly the Chinese and Japanese empires, have remained little known; lithotomo inquests have been made by the rapid tides of progress and civilisation which have expanded in every corner 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 Sowerby, and in 1839 and 1840 the practicability of a steam-bond 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 Sea to the Black Sea. The object of the enterprise is 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 Sawidish, who between two years succeeded in making a most accurate and minute survey of the level of the Caspian Sea, 84 feet below that of the Black Sea. During the years 1834 to 1837 Asia Minor was explored by Calle's, De Teissier, Brant, and W. J. Hamilton, the last of whom has given us a very correct geographical and meteorological view of Asia Minor, and determined the blanks of its eastern coast. In 1836 and 1837 Professor Koch 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 M. Bouchard and Captain Bézard, that the water of the Aral Caspian Sea was 22 feet lower than in the year 1817. The high water mark of 1837 was 100 fathoms below the level of 1783. This discovery was made accidentally by the officers of the steamer Paris, proceeding from Baku to Tiflis.

But, in the same year, M. Pettenkofer, the distinguished chemist, made an interesting discovery, that a part of the Caspian Sea, particularly the greater part of the eastern basin, is undergoing a process of evaporation which is of great importance to the commerce of the neighbourhood. The Caspian Sea, in common with the other large parts of the Atlantic, has no connection with the ocean, and is therefore not subject to the changes produced by the tides. It is but occasionally that a gale will blow so hard as to produce any perceptible wave, and the wind generally dies down before reaching the considerable depth of the basin. In consequence of this, a heavy current is produced by the difference of temperature, which is great in summer, nearly 80°, and in winter, nearly 100°. This current causes a progressive evaporation of the water, which consequently shrinks, and the part which rises is heavier than the rest, and consequently sinks again. Hence the difference of level is considerable, not from the tides, but from the evaporation of the water. The greater part of the water evaporated, which is very considerable, goes into the sea, which is the reason why the Caspian Sea is not connected with the sea. The water of the Caspian Sea is not salt, but contains only a proportion of salt equal to that of the sea, and is not a part of the sea. The water of the Caspian Sea is not connected with the sea, but is a part of the sea, and is not a part of the sea. The water of the Caspian Sea is not connected with the sea, but is a part of the sea, and is not a part of the sea.
A. odorata, the Woodruff, has its leaves six or eight in a whorl, with perfectly white flowers. It occurs in woods, fens, ditches, and at the side of roads in Europe. It is abundant in some parts of England. The whole plant is remarkable for its fragrance when dried.

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

Some of the species, A. armenis and A. taurins, are doubtful natives, but found wild now and then in

ASPIDOPHORUS, a genus of Acanthoperygious Fishes. One species, the A. Europaurus is found on the coasts of England and Scotland. It is known by the names of the Armed Bullhead, the Pogge, the Lyrie, Sea-Foscher, Plank, and Noble. It is a very small fish, seldom exceeding 6 inches in length. (Yarrell, British Fishes).

ASSIGNMENT OF CHATELIS. [HILL OF SALE, S. C.]

ASTERINA, a genus of Star-Fishes, including the smallest of the British species, A. gribonis of Pennyant. The Gibbous Starlet has a 4-sided body, which is thick and covered above and below with short spines; the avenues 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 A. asterina varia and A. asterina minor. The common is more generally found on the shores of Europe.

ASTRONOMY. [URBANITY.]

ASTROLOGY, a genus of Star-Fishes, remarkable for the branches of the European sea, which are in A. aculeatura, 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 Argos. (Yarrell, British Star-Fishes.)

ASTUR, T. V. G. S.,

ASSUCION, the capital of the department of Assuncion and of the republic of Paraguay, in South America, is situated on the eastern or left bank of the river Paraguay, in 25° 16' South latitude and 54° 47' West longitude. It is the chief town of the Araguai branch of the Pilcomayo. The city, which stands upon a commanding spot, was built in 1553 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 1543, the greater part of the houses being built of wood. From this calamity it speedily recovered; and in 1547 was a place of sufficient importance to be erected into a bishop's see. It contains a cathedral, a college, a hospital, and monasteries. It once contained a college of Jesuits. 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 trees. In the center of the town is the public garden, which consists 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. Assucion 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, mandioic, potatoes, and other vegetables. Honey and wax are produced in abundance; and the rivers supply large quantities of fish.

The air is in and about Assucion 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. Francia, 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 prosperity and wealth of the country. By treaties however concluded with the President of Paraguay in March 1853, the subjects of Great Britain, France, Spain, 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 13 feet can sail up to

Asparagin. [Crambe, S. 1.]

Asperula, a genus of plants belonging to the natural order of Paleaceae or Guttiferous. The genus is known by its funnel-shaped corolla, and by the fruit being dry and not covered by the limb of the calyx.
As a cove, above which the river Panguey is navigable for vessels of considerable size for 600 miles.

A THAMANTINE. [CHEMISTRY. S. 2.]

ATPROINE. [CHEMISTRY. S. 2.]

ATTACHMENT OF DEBTS. A creditor who has recovered judgment against his debtor, may now, on obtaining a separate judgment against the other by the assistance of a sheriff or by a 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 does not reside), by proceedings in any other action, enforce payment of these debts to himself, in discharge of his own claim; such payment operating as a discharge to the debtor. ('Common Law Procedure Act, 1854'.

AUCKLAND, [NEW ZEALAND. NEW.]

24DE EDEN, 2nd LORD AND 1st EARL OF, eldest surviving son of the 1st lord, was born in 1781. 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 was followed by the Act of Union with the Ath the affairs of the Empire (1858-63). The Earl of Auckland was recalled to England in 1849, having been previously advanced to an earldom; the final settlement of the Afghan affair was left for his successor, the Earl of Ellenborough.

Lord Auckland died soon after his return from India.

AUCKLAND ISLANDS, named after Lord Auckland, lie in 51° 8' S. lat., 166° E. long., about 900 miles S.E. 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 islets. 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 is covered with forest growth of luxuriant vegetation.

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. The coast is covered with forest growth of luxuriant vegetation.

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 lower than 35°, or higher in summer than 70°. 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 very fertile, and the hills, except a few of the highest, are thickly covered with large trees. The elevated ground is 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 collected; and of these, forty only, are commonly found in other parts of the globe. Several animals 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 1807 by Captain Briscoe, on his return from his second voyage, but they have disappeared, with the exception of the goats, a few of which are now kept for the use of the inhabitants. In the woods three or four species of small singing-birds were found. On the heights petrels breed in considerable numbers. Hawks, gray ducks, snipes, coromorants, and the common shag also inhabit the islands. Fish are plentiful in the coast of Auckland Island, and the rocks are covered with limpets; while the whale fishing carried on in the neighbouring seas 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 many other services which he rendered to the commerce of the south seas, by Captain Briscoe whilst in the employ of the Messrs. Enderby.

A 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 1849 the South Western Whale Fishery Company 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 there in 1849.

AUDOUIN, JEAN VICTOR, was born at Paris on the 27th 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 soon devoted himself to the study of medicine. His mind was early directed to the study of the natural history of insects.

In 1817 he published a work on the anatomy of the Insects, 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 the enlarged views of the natural history which so strongly interested him. The results of most 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.
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 his external forms were only regarded as dependent on an internal structure, which it its into a leigated form, essentially related to the whole animal kingdom. It was thus that he was led to investigate the annulus subordinate kingdom of animals, and succeeded in adding to science so many important facts which assist in indicating the true relations of the animals to one or other 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 naturalist, was born in Louisiana, in the United States, on the 4th of May, 1780. Both his parents were French. His father, who was an ardent admirer of the beauties of external nature, endeavored 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 the early manuscripts and engravings of the American birds, and cherished them as his choicest treasures. At this period, when any of his birds died, his chief regret was that he could no longer, either himself retain what had been so bright, or convey to others a notion of the departed beauty. In 1800, having placed under his eyes a book of 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 to draw well. At length he made his way to Philadelphia, where 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 at the recommendation of his teacher, who showed his list, he set forth to Paris, where he was given the title of the famous master; and, at the age of seventeen, returned to the 'Birds of America.'

In 1798 his father gave him a farm in Pennsylvania, near the river Schuykill, but he sadly 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." The farm, moreover, was unprofitable; and his father, a married young lady, who shared his after honours. For nearly twenty years he now pursued commerce (nominally) and his success was what may be easily supposed. He removed to the westward, and thence to London, and finally to France, where his example excited still more a zeal that needed no spur. 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 left at length abandoned his nominal business altogether.

On the 5th of April 1824, he visited Philadelphia, where Dr. Mease, his only intimate friend in the place, introduced him to Charles Lucien Bonaparte, prince de Moustagan, bulle, brother of the Emperor Napoleon, who 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, taking the Hudson for his high-road, penetrated into the pathless woods. 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 arrangement given of the dimensions of nature; 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 family, and passed all the surrounding forests, and then sailed to Europe. 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 referred to the hands of London artists. In September 1828, he once more visited France, where he was rapturously welcomed by the scientific world. Baron Cuvier pronounced a panegyric of him before the Institute. Charles X., Louis Philippe, and the Duchesses of Orleans were present. Mr. Humboldt, the Institute, and others, joined his subscription list. By the 25th of November 1828, the eleventh number of the work, and 100 plates, had appeared.

He now devoted himself for the purpose of refreshing some of his drawings, and of bringing his wife 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 forests of Mammaw, 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 Royal Society of Edinburgh; a member of the Board of Natural History at New York; of the Natural History 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, and Architecture, and other important associations. 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 the drawings. The life of exploration and study was prolonged to the ripe age of 71. He died on the 27th of January 1838, at Minniesland, near the city of New York.

AUSTRALIA, AUSTRALIA, of the 'Penny Cyclopaedia,' a brief narrative has been given of the successive discoveries of the various exterior portions of the continent, and also of the most important surveys of the coasts. The principal journeys of exploration of the interior which have been thus been made were conducted by Dr. Grey, Cunningham, Oxley, and Stuart, and the information acquired is embodied in the article above-mentioned.

Further Progress of Discovery. Captain Sturt, in 1828, had discovered the river Darling, and traced it downwards about 30° S. lat. In 1829, he abandoned it. At the end of 1829 Captain Sturt was again sent into the interior, to trace the farther course of the rivers. He proceeded to the south of Sydney, and intersecting the course of the Lachlan, he discovered the Murumbidgee. In 1835, traced the Darling from the point where Sturt had left it in 1828 down to 23° 30' S. lat. In 1836 Sir Thomas Mitchell followed the course of the Lachlan downwards, and crossing from that river to the Murumbidgee, from it gained the banks of the Murray, and, following its course, reached the Darling at its confluence with the Murray.

In 1837-38-39, Captain George Grey conducted two expeditions in north-west and western Australia, and made some important discoveries in Western Australia between Cape Currie and the Swan River, about 32° S. lat.

In 1838 Captain Sturt led an exploring party overland from New South Wales along the banks of the Murray. He commenced his journey at the ford where the Hume intersects the road to Port Phillip, and in so doing crossed the whole of the waters of the south-east angle of the Australian continent.

In 1839 Mr. Eyre fitted out an expedition, and tried to penetrate northwards into the interior, but having descended Mount Arden, on the western side of the range, within about 20 miles of the coast, he was driven back by the severe storm, and returned to the same point. He therefore went to Port Lincoln, whence he proceeded along the line of the coast south to Fowler's Bay, the western limit of the colony of South Australia. He then returned to the coast, and pushed boldly forward to the N.E. for Mount Arden, more to the south of the range, but was unable to advance farther than 30° 30'.

In 1840 Mr. Eyre again conducted another expedition towards the central part of the continent. He was unable to penetrate to the north, but steadily advancing westward,
after a journey of excessive difficulty and privation, established the startling fact that there is not a single watercourse on the whole coast from the mouth of the Albert River, Aug. 30, 1843, to the mouth of the Albert, Aug. 29, 1845, a distance of more than 1,500 miles.

Whilst these attempts were being made to penetrate to the interior from the coast, a naval expedition was actively engaged on 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° 50' S. lat., and the Albert, in 17° 20' S. lat., 139° 54' E. long. Captain Stokes succeeded Captain Wickham in the command of the Beagle, and penetrating nearer to the north than had been done before.

Captain Sturt, in his last journey, left Adelaide on the 13th of August, 1843, 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 6th of September, 1845, he reached 24° 30' S. lat., 136° 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 borders the southern 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 29° S. lat., and which he named the Victoria. It tended to the north-west, but it was left of the expedition, 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, toward the interior. He followed it for about 100 miles beyond the point where he left it was left behind, and from the quarters of the expedition in 1844, 1845, and 1846. In this last and fatal journey, he search of the country around, he found a country of remarkable beauty and fertility—a discovery which he, with characteristic ardour, returned 300 miles to the nearest frontier station. 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 squating 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. Leichardt started on his overland expedition from Moreton Bay to the north coast, at the end of September, 1844, and returned to England on the 24th of February, 1845. In this journey Dr. Leichardt crossed 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 desert. This journey was undertaken in 1844, 1845, and 1846. In this last and fatal journey, he was accompanied by Mr. Lynd, whose name has been given to one of the rivers on the north coast. Dr. Leichardt 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 expedition to the interior of Australia was that of Mr. A. C. Gregory, from the north coast, which was organised at Moreton Bay, and proceeded by sea to the mouth of the Victoria River. The horses were landed at Point Piers, in September, 1846. On the 9th of May, 1846, the party was employed in preliminary details, and in the exploration of the country to the south of the Victoria River, having penetrated the interior deserts to 18° 20' S. lat., 127° 30' E. long. On the 21st of June Mr. Gregory left the encampment on the coast, accompanied by Mr. Stirling. The rapid progress of the country compelled them to increase the latitude to 15° S., after which they kept parallel to the coast as far inland as water could be found in the rivers, the greatest difficulty of which is the scarcity of rain in the sea, not exceeding 100 miles. Proceeding north-east from the mouth of the Albert River, for 10° or 12° S. lat. and 18° 20' S. lat., when the Gilbert River entered the mouth of the sea, the second hop was left. Crossing the head-waters of the Lynd in 18° 40' they reached the Burdekin, Oct. 18. Their route was then along the right bank of that river to the junction of the Suttor River, which was followed up to the Beylando. Tracing the course of the Suttor River, they arrived at the mouth of the Ybar River, which was the mouth of the river which runs to 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.

The Australian 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 mountain-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 rivers flow to the north to the sea, while the streams flowing in the opposite direction are declining, however, considerably towards the south. Its entire length from its source in the Liverpool range is above 300 miles. It is navigable for small vessels up to Morpeth, about 56 miles from its mouth. Its two principal tributaries, the Warrego and the Boggo, which run along the eastern side of it, are navigable for a somewhat greater distance. At the mouth of the Hunter is the town of Newcastle, the chief shipping-town of the Hunter coal district. In the vicinity are extensive coalfields, the largest under the name of Cumnor, which is worked by the Barby Brothers. Much of the coal from the Barby Brothers, and other South Australian mines is smelted here. Up the Hunter the land is much more fertile than along the coast, and the towns of East and West Maitland and Morpeth are the centres of extensive coalfields. The town of Morpeth is on the north of the Hunter, and the Hastings, which falls into Macquarie Bay, still farther north, also runs nearly east and west: neither exceeds 100 miles in length. Port Stephens, about 20 miles north of the Hunter, is a bar bour, but convenient for small coasting vessels, and the outlet of the produce of the Australian Agricultural Company, a part of whose extensive territory stretches along its northern bank, and for a considerable distance up the river Karah, of which Port Stephens is the mouth. The Hastings forms the small harbour of Port Macquarie.

North of Port Macquarie the country changes greatly in character. The mountains are very lofty, some of them attaining an altitude of 6000 feet, while the formations are often of great richness and fertility. The country is rich in coal, and among them the Bellengem, the Clarence, the Richmond, and the Tweed, are navigable for coasting vessels. The vegetation is more luxuriant, assuming more and more of a tropical character as we proceed northward. The timber is of a larger and more useful character. Moreton Bay, especially is characterised by its pines, of which the finest are the Moreton Bay Pines (Aroracius Crandallii) and the Bunya Bunya (A. Sedgelli). The cedar is also great repute for the beauty of their wood, and the chestnuts are much valued. Cotton, coffee, sugar, and tobacco grow vigorously in this part of Australia; except tobacco, however, they are little cultivated, in consequence of the impossibility of obtaining labourers. Moreton Bay is a fine harbour, 60 miles long from north to south by from 3 to 20 miles wide. The islands Moreton and Stradbroke stretch across its mouth, leaving on the south merely a narrow passage navigable only by boats, but on the north there is an entrance sufficiently wide and deep for ships of the largest size. Between the islands lies a dangerous sand-bar. The navigable route to Brisbane and Logan, with several smaller streams, fall into the bay. The Brisbane is a large and important river, having its fairest source in the coast range near 15° 30' E. of its mouth, and its course is towards the east. It is navigable by vessels drawing 16 feet of water 20 miles 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 drengths 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 gradual transition, into an extensive plain of sandstone or limestone. They are mostly barren, but at some distance near the Blackwood River, which falls into the sea at the western angle of Flinders Bay, Mr. Ross found considerable forests of timber-trees fit for naval purposes; he also discovered good gardens of melons, cucumbers, &c., and 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 capital 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. The mouth of the Swan River is distant from the coast about 100 miles; the coast is studded with high headlands, some of which are 800 to 1000 feet high. Numerous islands, some of them basaltic, line the coast, and the scenery is wild and striking. Mounts Trafalgar and Waterloo rise to the height of 800 feet, and Mounts Greville, 140 miles to the north, are the highest. 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 landed on the west side of the mouth of the river, which he called the Fitzroy Range. In its lower course 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 Fitzroy Range rises in one or two ranges to the height 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 impassable ranges. North-east from the Victoria and the Fitzmaurice rivers is the Macdonald range, which consists of hills averaging from 400 to 600 feet in height. Near the shore, between Cambridge Gulf and the Gulf of Carpentaria, these hills become lower, and terminate generally in sandstone cliffs, seldom exceeding 50 feet in height. But about Malivare Bay granite occurs. At Coburg Peninsula, where was the now abandoned colony of Port Essington and the town of Victoria, the cliffs are of red sandstone; the interior of the coast, which is broken by low hills, consists of a continuous forest.

The shores of the great Gulf of Carpentaria are almost invariably low and flat, and generally covered with mangroves, with bushes or sand, are seldom more than from 10 to 30 feet above the level of the sea. On 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 is 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 casuarinas and gum-trees. West of this, to Strezlecky 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 Strezlecky Bay, and extending into Western Australia, is a waste and dreary country, covered merely with scrub.

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 no remarkable appearance; from Strelitz Bay to Cape Arid, about 1000 miles, there is an unbroken line 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. Imagine a waste, of blue hills. King George’s Sound, at the mouth 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 southern part of the Great Australian Plain, called the Great Western or Australian 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 500 to 3000 feet above the sea. Portions of these connected mountains are known as the Gairdner’s, Morebey’s, Herschel, and Victoria ranges. The highest summit, Tumbarine, is said to attain an elevation of 5000 feet. The coastal districts are said to be fertile, and to produce sandstone or limestone. They are mostly barren, but at some distance near the Blackwood River, which falls into the sea at the western angle of Flinders Bay, Mr. Ross found considerable forests of timber-trees fit for naval purposes; he also discovered good gardens of melons, cucumbers, &c., and 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 capital of Western Australia, is built at the mouth of Swan River.

The sheep of this country are of the finest quality. The wool is long and fine, and is said to be especially adapted for the manufacture of hessian. The hides are said to be of the finest quality, and to yield leather of a superior kind.
of drift sand sometimes 100 feet high, running in parallel lines as far as the sight could reach. The dryness and the heat of the day made the appearance of this plain, near 26° 33' S. lat., 139° 30' E. long., was a memorable story 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 the Snowy Creek. The stream flowed for nearly 80 miles, and ending on each side in arid sands. 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 my last number, was discovered by the mountainous 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 marshland, and most of it is possessed of occasional unconnected pools and muddy holes. In seasons of great floods it would no doubt be filled with water, which 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 to a height of 3000 feet, and in others along a level wide, fertile, and thinly wooded 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 more or less stony character, and as far as the Darling Downs, discovered by Mr. Cunningham, the Fitzroy Downs discovered by Sir T. Mitchell, the Goulburn, Bathurst, Manero or Brisbane Downs, and the New England districts, with vast fertile plains, lying along and between the great rivers. These downs afford the chief sheep runs, the plains the cattle pastures. Farther inland are wide-spread marshes and worthless jungle, and enormous barren, arid, and sandy, or stony deserts wholly uninhabitable, and which have hitherto baffled the attempts of man to explore them. They have not been found; the densest are those which occur in the Moreton 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 is 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 swamps. By means of these the sands are carried places quite dry and they are converted into a number of scarcely connected lagoons. Few of the rivers which fall into the sea are navigable, and nearly all have bars or other obstructions which prevent their use.

The Murray is an exception 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 38th to the 32nd parallel of latitude, and from 146° to 148° of longitude. It reaches the lowlands 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 be a costly and tedious process, and useless also unless an embargo was formed, as their river is subject to annual overflows, when the country for a considerable space on both sides is converted into a swamp. These floods prevent agricultural operations being carried on, and the banks of the Murray above the junction of the Murray and the Murrumbidgee attempts have been made to raise wheat on the sandy heights, but they have not been successful. On its left bank the Murray receives in this part of its course, the Lachlan, the Goulburn, the Campaspe, and several other streams; on its right is the vast impassable tract known as Murrumbidgee, which lies between the Murray and the Murrumbidgee 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 Billibong River. A large part of the drainage of the Murray and the Murrumbidgee is a swamp; much of the remainder is cut up by the Edward, and the many connected channels, and the innumerable lagoons, or biddlesong as they are called by settlers. Many of these lagoons have on the top a thick growth of sedges, and in the valleys, and along the edge of the flood, and in the 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 30 feet deep. The banks are at the rate of 40 feet above the flood of 143° E long. it is joined also on the right bank by the Darling, which is here 100 yards wide and rather more than 12 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 lime stone cliffs and its course is west 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 extends into the sea to a distance of about 50 miles from the head of the lake 350 yards broad and from 20 to 30 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 capable of carrying the heaviest goods at the mouth. 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 stopping short in its course, as they do, its falling or terminating in a marsh or exhausting 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 tranquil waters to the sea.

The Murray receives 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 grows it fills in succession all its lateral creeks and lagoons, and ultimately lays many of its flats under water. As it rises, so it falls, gradually. No river falls into the Murray after its confluence with the Darling, nor does any fall into the Darling from the west after it reaches the low lands of the salt range. The rains that are in the Japanese months, when the Murray rises, the Murray collects several overflowings which are fed by the northern rivers, the Murrumbidgee, and other interior streams. Geochemistry and Mineralogy are essential to an understanding of the level of the Murray. The Murray is the only large river in Australia, which the Murray and the Darling in the east and west. Granite forms the axes of the ranges of mountains 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 in the form of small rounded masses, in the interior, the felspar and hornblende so largely abound as to modify the granite type; in some places the hornblende predominates, and frequently, as between Armiprior and Braidwood, the granite passes into sienite and porphyry. Examples of all these varieties are met with in the Australian Alps, about
the sources of the Murray, in Moneroo, in the Carrumbenya Range, the Araluen and the Main ranges, Mount Victoria, and many other localities. The rock formation is extremely\nvery widely, and vary as usual very much in their\ngneissic structure. Very commonly they consist of basalt,\ngneiss, and various amygdaoids, and have an overlying\ndeposit of conglomerate grit and sandstone. The trappean\nregion of Maneroo, which may be taken as illustrative\nand Hammerton (1862) occupied a trough\nbetween granite mountains (here the Snowy and the Coast\nmountains), which it has filled up, sending its streams of\nsmaqueous lava to considerable distances on each side of\nthe general line of the axis of eruption. In Maneroo this\naxis has a north-west and south-east direction, and ranges\nfrom the head of the Tawomba towards the principal head\nof the Murrambiggee, at the northern extremity of the\nSnowy Mountains, or Australian Alps. Connected with this\ngeneral trend of the trappean rock, which has produced\nthe plateau or plains," as bare tracts occupied by basalt, &c.,\nare improperly locally designated, are various outlying hill\nand ranges, insulating patches of the schistose rocks, or\npeering and transmitting the larger masses of that system.

But the discovery and exploration of the Australian\nagency, their texture, structure, and composition, prove\nthem to have a common relation with each other, and with\nthe great development which has occasioned the remarkable\ncontrast of the mountains ranges to the north and South\nCoast ranges to the east, and the constant marked anti-
clinal division between the waters flowing on the northern\nside to the Murrambiggee, and on the southern to the Snowy\nRiver. It is to the trappean outburst, which is undoubtedly\nconnected with the discovery of the Snowy and Coast ranges,\nthe condition of the present surface of the counties of Beresford,\nWallace, and Wellesley is in a considerable measure due;\nit has directed the principal drainage of the country in two\nopposite courses, and has produced innumerable physical\ndisturbances of great extent.

A large portion of the basin of the Murrambiggee is\noccupied by quartz phrynyte, which is also largely developed\nin many other places. Porphyritic and basaltic dykes are\nvery frequent. Very fine examples of columnar basalt occur\nat Cooma and elsewhere, and the rock of the``Merbein``\nand the``Burowra`` are porphyritic and basaltic dykes in\nunmarkedly in other parts of the great mountain district.

Serpenite, soapstone, pitchstone, and a fine red jasper are\nfreely met with in the trappean districts. Laminated,\ncoaled, and coaled and conversed, as the term is used\nin the coal regions, occur in several places. In the\ngrid of the gullies running into the Boshell\nhaven, a little below Glenrock, the limestone is seen passing\nto statuary marble, white and crystalline; black marble\noccur in strata in Bourough Creek. A bed of limestone,\nwhich contains small quantities of fossil shells, has been\nfound in the north and south of Bathurst, has been termned carboneous. The coal and associated bed of sandstone and shell, which occur\nextensively on the eastern coast from Port Stephens to\nBotany Bay, occasionally ranging into the interior, have\nbeen considered equivalent to the coal-measures of Europe,\nmerely from their mineralogical characters. What the age\nof this Australian coal deposit may be we have no means of\naccurate judging; but it is worthy of remark, that a fossil\nplant (Glossopteris Browni) detected in it is also found\ndiscovered in the Damara coal district in India. The coal\nitsell appears to be abundant and generally of good quality.

Coal also occurs in great quantities on the Warrumbung\nand elsewhere in the mountain district of New South Wales. Mr. Roe in 1844 discovered coal by the south of the\nFitzgerald River, about 149° 40′ E. long., 34° 10′ S. lat., and by the Phillips River some distance to the west, both places being in or near to Dungeness Island and easy of access. It has also been met with in several other places.

Sandstone rocks extend very generally through the mountain district. Sydney is built upon a sandstone deposit, which\nextends as far inland as Mount Victoria, and forms the bulk of the river valley. The city of Sydney is built largely upon\nthe sandstone.

The sandstones are of various kinds, fossiliferous, ferruginous,\nsilicated, argillaceous, and calcareous. In parts they appear\nvery similar to those of the old red sandstone formation of\nEngland. Found in conjunction with fossiliferous lime-\nstones and conglomerates they closely resemble those of the

Devonian system. Both the limestones and sandstones are of\nexceeding value for economical purposes. Sandstone and\nlimestone rock are extensively in use for building stone,\nfrom 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\nimportant. A quartziferous schist is the predominant rock of the country between the Gumban Plateau and the\nGreat Valley, and it prevails extensively throughout New South\nWales and the eastern part of Victoria. The soil which\ncovers this rock is generally poor, but the rock itself is rich\nin mineral resources. The slates are commonly gray, bluish, or\nyellowish; goethite occurring as streaks and film-like veins.\nThe slates are not uncommonly intersected by veins of\nquartz and tourmaline. Gray or brownish-white, soft or hard,\nfusible beds of schist occur in conjunction with the slates,\npassing into the true slate or sandstone, and becoming occasion-
ally very quartzose, bands of quartz and transparent\nfibrous veins of quartz traversing them. Clay-slates and\nother argillaceous deposits are also general. The clays and\nother tertiary deposits occupy a wide area; in fact, it is\nprobable that the whole of the area is formed of horizontal\ntertiary deposits, broken here and there by hilly tracts\nrising out from them, like islands from the bed of an inland\nsea. Good brick and pottery clay is found.

Australia was not until lately considered rich in minerals.\nThe first discovery of minerals in Australia was in 1845, and still more the extraordinary discoveries of gold in 1851, however led to investigations which have gone far to\nshow that Australia is mineralogically one of the richest\nregions of the world. The first official mention of gold\nbeing discovered in Australia was in an official letter from the\nSecretary of State from Sir George Gipps, lieutenant-governor of\nNew South Wales, dated 2nd of September, 1840, in which is\ncorded a report from Count Strehlecki, stating that he had\nderived the information from a grazier named Caddy, who had\ndiscovered in a small quantity of gold in an "auriferous sulphuret of iron, partly decomposed." No further notice was taken of this communication. Sir R. I. Murchison, however, in the course of various state-
ments respecting the Ural Mountains, which he read to the\nGeological Society of Dublin, in 1841, and in his geological\nand 1842, called the attention of men of science to the fact of the similarity of the formation of the Australian to those of the Ural Mountains, and asserted his belief that gold\nmust exist in Australia. No steps were taken to pursue the\ninquirу practically, and Sir Robert Banks, in a letter to the Geological Society of Cornwal, urging unem-
ployed Cornish miners to emigrate and search for gold in the\ndrift and debris of the Australian Alps. In 1848 Sir Roderic\nand Great Britain, addressed a similar letter to the Geological Society of France for the Colonies, stating his reasons for believing that gold\nwould be found in Australia in large quantities, but no notice\nwas taken of his communication. Meanwhile efforts had\nbeen made to attract attention to the subject in Australia.\nSir Charles Sturt, who had been sent to the west coast of New\nS. W. in April, 1851, when Mr. Hargraves, who had returned from gold-seeking in California, wrote to Governor Fitzroy, an-
nouncing that he had been seeking for and had found gold,\nand offering to discover the locality for a certain reward;\nand somewhat later Mr. Lancefield forwarded a specimen weigh-
ing 34 ounces, which he had found in the river Turon, near its\njunction with the Macquarie, with a similar proposal. Sir Charles Sturt, who had been sent to the west coast of New\nS. W. in April, 1851, when Mr. Hargraves, who had returned from gold-seeking in California, wrote to Governor Fitzroy, an-
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Bathurst and Wellington, about 180 miles west of Sydney. When the government officer was sent in May to examine the place, he was received with kindness by them. 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 it was found at once to be quite impracticable to prevent, and no restrictions were given by the governor to grant licences at the rate of 80s. per month. By May 20th there were 1000 persons employed in digging and washing at Summerhill Creek and its neighbourhood, which took the name of Ophir. In July colonists arrived at three places on the colony's borders and in 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 terminus of the colony as his pennonier; in 1858 a further sum was awarded to him, making his reward in all amount to 5000£.

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 usual avocations were at an end, and even the ships on Rinn, to which every one capable of labour repaired to the diggings, so that serious apprehensions were entertained that the growing crops would be left ungathered, the wool of the numerous flocks of sheep and cattle would be destroyed, and the principal towns would be deserted. These evils were for the time fortunately 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 computed that there were from 90,000 to 100,000 persons left London for Sydney and Melbourne, and it was found difficult to provide ships to convey them. The emigration from England during 1850 was an equally large scale, but has since somewhat diminished. [Note: The population of the colony has increased in the proportions of provisions rose greatly, particularly at 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 thrown 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 total revenue was 230,176£., in the three quarters ending September, 1852, it was 979,476£. 3s. 1d., being an increase of 763,304£. 14s. The revenue of Victoria in 1857 was upwards of 3,000,000£. From the first discovery of gold on 4th February, 1851, the amount of gold mined in Victoria has reached a total of 10,000,000£.; of this gold found in the colony of Victoria alone stated by colonial authorities to have amounted to 5,166,234 ounces, of the estimated value of 19,373,577£. The gold exported from Victoria during the year 1857 amounted to 5,652,793 ounces, valued at more than 10,000,000£.

The places where gold has been found are now extend from the Grafton range, New South Wales, in 26° S. lat., 149° E. long., to Ballarat in Victoria, 37° 7' S. lat., 144° 15' E. long.; while two small gold fields have been discovered about 27 miles from Adelaide, South Australia, 33° 3' S. lat., 135° 30' 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 where gold-mining has extended the most, is that district of Victoria, where the gold has been officially estimated by the 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 truth, and very far from being exceeded." The gold is found generally among the mountains, in creeks and gullies, and the other water-courses, and on the flanks far above the water level, but usually at elevations not exceeding 3000 feet above the level of the sea. It is found in granite, wherever quartziferous schist occurs, throughout the Alpine formations, and largely in bands of argillaceous iron ore.

Copper, as has been mentioned, had been found in large quantities in South Australia some years before gold began to be discovered there. The first of any consequence, was discovered and opened with great profit in 1842. In 1845 the Barra Barra mine, apparently one of the richest in the world, was discovered. The total quantity of copper from this mine up to September, 1851, was 72,795 tons. The mine occurs in the clay-slate formation; the lode 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 submerged the copper industry, and thecareful 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 metalliferous veins, of considerable value. Some of the copper workings have been passed away, lead to most important mining operations. The value of some of these regions may be estimated from the fact of the discovery of a large deposit at a distance of half a mile from the town of Broken Hill, near the junction of the Slaughter-House Creek with the Delegate River, about 37° 3' S. lat., 149° 14' E. long., near the boundary of New South Wales and Victoria. The district is occupied by salt-bush, 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 limestone to serve as a flux in case of its requirement, and abundance of gypsum, which occurs in large masses along with wood upon the ranges at no considerable distance." The whole basin of the Murrimbidghee, from near Bullanamang to the junction of the Queenbaryan River, is also said by Mr. Clarke to exhibit a well-defined formation of ironstones, nearly水平 occur in conjunction with abundance of limestone; quartz porphyry is here the prevalent rock. And in other districts the metals have been found under equally promising circumstances.

Lead has been found near 31° 36' S. lat., in New South Wales, and worked successfully at Yattagolings mine, 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 there are frequently found, in many places; it has also been found in the Darling Range and near Murchison River in Western Australia.

Iron ore abounds on the eastern coast of New South Wales, where also good 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. It is suggested to the iron-works of the mountain districts beyond the Warrumbungil mountains. Argillaceous iron ore occurs extensively in the regions of the Australian Alps. In South Australia iron-ore is said to abound in the mountains on the south coast near Encounter Bay, and in the ranges from Cape Jervis to Black Rock Hill. No iron works have however, we believe, been yet established.

Native silver has been discovered in the mountains of Tin occurs in several places. Blacklead is said to have been found near Adelaide, at Mount Torrens, and in the Beulah 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-field. In the mountain explorations of the mountain ranges, and consequent investigation from various localities in the same district; to which may be added from other authorities and different parts of the country the hyacinth, amethyst, jasper, carnelian, agate, and opal. Copper appears to exist in Western Australia, South Australia, and Victoria, as well as in New South Wales; but the finest beds yet discovered are those about the Hunter River, in the last-mentioned colony, which are extensively worked, and yield a superior quality.

Salt is found over a large part of the country, and the saltworks are numerous and extensive.
Large tracts of limestone occur on the eastern and south-eastern side of the continent; clays fitted for the economical purposes of life are common in many places; there are numerous sandstones which seem well adapted for ornamental buildings; gypsum is found abundantly in the clay or marl, extending from Bathurst to the Hunter River, and in the vicinity of Swan River; and there is roof-slate both in the eastern and western parts of Australia.

Climate. — The climate of Australia differs considerably from that of other countries. One of the most unfavourable characteristics is the long droughts which occasionally prevail. Captain Sturt says:—"The year 1826 commenced the fearful droughts to which we have reason to believe the climate of New South Wales is particularly subject, the interior quality of the soil, and the severe weather with unabated severity. The surface of the earth became so parched up 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 locks and herds to distant tracts for pasture and water. The interior suffered equally with the coast, and men at length began to despond under so alarming a visitation. It almost appeared as if the Australian sky was never again to let down rain in the long season of New South Wales, as it was said to occur every 10 or 12 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 that the thermometer ranges from 70° to 100°, and it is not unusual for it to exceed 106°. The thermometer then rises suddenly from 50° to 110° in the shade. On the other hand, the south-eastern winds are often excessively cold. If the weather is calm after the north-west winds have blown, the thermometer falls very suddenly, and the cold is frequently followed by a heavy rain. The thermometer in South Australia often falls 40 degrees in a quarter of an hour.

In spite of these 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 Europe. Even the great heat which occurs does not produce relaxing and enfeebling effects on the constitution. In the towns and cities, many stock-keepers leave the town during the summer (from September to March) between 36° and 106°, and in winter (from March to September) between 57° and 95°, its mean being 66°.

In the north little rains are received during the wet season commonly takes place during the summer; on the coast it commences in the beginning of the winter. Dews are very frequent and heavy, and sometimes they fall like a drizzling rain. Hail-storms 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 villages in November and December. The weather is occasionally unknown in the neighbourhood of Sydney and other parts of the coast. In his explorations of Tropical Australia, Major Mitchell experienced much frost, the thermometer being on the 24th of June 17° Fahrenheit, or 15 degrees below freezing point: no discomfort was felt from the cold experienced by any of the party, a circumstance which attributes to the great dryness of the atmosphere.

The climate on the eastern coast is very favourable to health; and excepting the period of the extraordinary drought, there is not seen within the present limits of the country, ophthalmia, which occurs in the month of October and November, and is produced by the winds which prevail at that time. These winds are general in nature; but they are un pleasantly warm, but they resemble in some measure the Eastern and Western winds which blow in any other season. They are accompanied with high pressure, and are generally accompanied by high pressure, and are considered as the cause of the then prevailing ophthalmia. The country north of the Hunter River appears to be much less liable to droughts, and the wet and dry seasons occur with considerable regularity; but the temperature is hotter on the whole, and the climate less healthy than further south.

Soil. Productions.—The soil of so extensive a country and where the geological formations are so varied, differs of course very greatly in different parts, and the productions of the agriculturalist vary in almost an equal measure. For a notice of the usual crops and productions we refer to the alphabetical lists already given; we will only say that almost every variety of grain is raised, and generally of excellent quality. The colonies of New South Wales, Victoria, and South Australia are those which best repay the labours of the agriculturist. The soil of Western Australia is of inferior quality, and the produce of South Australia is very inferior. The cultivation of the soil is very far from being neglected, the breeding of sheep and cattle is the chief occupation. South Australia is especially a grain-growing colony; wheat the finest quality is raised, and the crops are very large. Maize, which succeeds excellently in New South Wales, seldom succeeds well in South Australia. Barley and oats are much grown for grain crops. Rye is not very extensively raised. Tobacco is grown largely in the Hunter River district. Cotton-growing is important in North and South Brisbane. Hops are grown in various places. Nearly all European vegetables are cultivated; potatoes form important crops in cool and moist localities. Although Australia was almost entirely without indigenous edible fruits, at the present time almost all of them are now successfully raised there; and the grape and the olive appear likely to take rank among the most valuable of its productions. The vineyards of New South Wales are already extensive, and wine of excellent quality has been made in some cases. The vegetables of the interior are plentiful, but the climate is too dry for the development of an extensive horticulture. The climate in the interior is too dry for the development of an extensive horticulture.
of 200,000 sheep were in June, 1858, 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 success so complete and triumphant as 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 bêtes occupied by native married couples. There is also a small farm, the work of which, with herding, cattle keeping, &c., 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 be kept in "continual order among 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 government 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 and north-east from New South Wales by the Murray River, and a line coming 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 133° E. long., and northward to 26° S. lat. Western Australia occupies the entire country west of 133° E. long. North Australia occupies the entire country north of 26° S. lat. and east of 133° E. long. The population is chiefly European, except about the south-eastern 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 (exclusive of natives and Malays) in 1850 was 355,107, of whom 266,503 belonged to New South Wales and Victoria, 63,700 to South Australia, and 25,804 to Western Australia. It has since very rapidly increased, owing to the immigration consequent on the gold discoveries.

On August 6th, 1850, an Act of the Imperial Parliament received the royal assent, by which representative constitutions 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, in ERROR, in civil causes, is now regulated by the Common Law Procedure. [1822] No practical change has, however, been effected by this statute.

BAILLIE, JOANNA, was born at the manse at Bothwell, near Glasgow, in 1792. She was the sister of Dr. Matthew Baillie. The history of her uneventful life is soon told. The daughter and granddaughter of a minister, and of a mother in whose family superior intelligence seemed a common property, Joanna, while trained in the strict manner usual in a Scottish manse, not only received an excellent education, but from her childhood was brought into contact with tragedy and the world of art. She seems to have retained her own mental gifts. Her career through life was quiet, unobtrusive, domestic; her tastes were all studious; her disposition was gentle, kindly, and benevolent. At an early period she removed to London, where her brother, Dr. Baillie, 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 based on atmospheric electricity, came to obtain her acquaintance and to listen to her conversation. Those who visited her out of admiration returned adding to that sentiment of affection and respect. She died at Hampstead on the 23d of February, 1851, in her 86th year, having retained her faculties to the last.

Though Joanna Baillie possessed in a large measure that keen and sensitive interest in all that developed the feelings or touched the destinies of others, and that sensibility and sympathetic imagination, peculiar to the female temperament, yet these sentiments had in her instance more of pensiveness and of speculative nature 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 Baillie's feminine and modest disposition, must invoke the muse with a serener and more gentle worship. A close and penetrating observer, and gifted with so common genius, yet not favoured with the heights, nor endowed 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 Baillie early in life conceived a literary project based on a principle essentially erroneous, but leading to the production 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 the prompts 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 master passion is often admirably exhibited—laid bare in its 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,' the daughter of 24 years old. As a basis the production met with great success; 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 was 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, so far as his temper and situation of life permitted. The schemes for the amelioration of the position of the poor fellow-townsmen, by advocating the establishment of hospitals, friendly societies (savings-banks had not yet been established), and even the abolition of oaths, the gains of 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 independent spirit and advocacy of positions he held, 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. Ladbrooke, although he differed in opinion from Lord Milton respecting the danger of the Reform Bill on terms, and a reform in parliament, both of which he advocated, while there were few more earnest in supporting the dignity of England when threatened by France, and his appeals to the inhabitants of Leeds to join the volunteers when an invasion was feared, had a most remarkable effect. But we are not about to narrate all the incidents connected with Mr. Baines's conduct of his paper, which was carried on with a strict adherence to the same principles until the close of the Napoleonic wars. He held the principal means, in his paper, of developing, in 1817, the conspiracy of Oliver and Castles, the paid emissaries of the government to foment insurrections in the northern counties, and that after his return to Leeds he made his first prominent appearance as a public speaker at a meeting at Leeds to oppose the enactment of the Corn Laws, and in 1817, at another in favour of parliamentary reform. In 1814 he commenced the publication of 'The History of the Wars of the French Revolution,' which met with such success that he continued it under the title of 'History of the Reign of George III.,' the whole being a compilation of considerable impartiality and talent. In 1822 and 1823 he wrote and published 'The Directory of the County of York,' in two thick volumes; and in 1824-5 a similar work for the county of Lancaster, subsequently expanded into 'A History of the County Palatine and Duchy of Lancaster,' which was not completed till 1856. In 1834, on a vacancy being made in the representation of Leeds by the appointment of Mr. T. B. Macanlay (now Lord Macanlay) to be one of the commissioners in India, Mr. Baines was chosen member in opposition to Sir John Beckett, after a severe contest. In the House of Commons he maintained the character he had acquired in the press, and though not a brilliant speaker, his integrity, independence, industry, and conciliatory manners, with his close connection with the dissenting interest, made him an influential member. In January, 1837, he collected, and generally supporting the Whig party, he was opposed to them in their schemes for public education, which he always contended would be best effected by voluntary subscriptions, and he deprecated the assistance of the State as tending to give a undue domination to the Established Church. In 1841, his health having suffered from the sedulous performance of his parliamentary duties, he retired from the representation, and proposed Mr. Hume as his successor, who however was defeated. In September of that year his former constituent presented him with an elegant silver service as a testimony of their recognition of his services. From that time he retired to some extent from public life, but continued to take an active part in local affairs, both as a magistrate and a poor-law guardian, in both capacities promoting social improvements as far as lay in his power; and he was always ready to interpose as mediator between the men and their employers in the many strikes that took place in the north, representing to the men the folly of their having recourse to violence in endeavouring to effect their object, and who recommended the desirability of placing the men in as comfortable a position as the circumstances would allow. In 1845 the Leeds Mercury warned the speculators of the danger attending the railway schemes then proposed; he seized the advantage of the railway system. He saw that though the facility of communication was a great good, yet that if it became a mere traffic for premiums, it was likely to produce much disorder. In 1846 he had declined to accept the office of postmaster-general, his fellow-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 abandoned. On August 3, 1848, at a short notice, he died, and was honoured by a public funeral.

Balbi, Adrien, was born at Venice, April 22, 1783. At an early period of his life he was appointed professor of geography at the University of Padua. He published in 1826, with the assistance of Dr. A. F. von Humboldt, a work entitled 'Essai Statistique sur le Royaume de Portugal et Algavre, compare aux autres Etats de l'Europe,' published in Paris in 1831. He was one of the first to collect and publish charts of the European seas. He published in 1828 the first volume of his 'Atlas Ethnographique du Globe; ou, Classification des Peuples anciens et modernes d'apres le Langage des peuples qui les avaient precedes.' He was acquainted with the researches of Adelung and other German philologists. Balbi however improved their arrangement, and added much information gathered from the accounts of such travellers as A. von Humboldt, Freycinet, and others, as well as from linguists such as W. von Humboldt, Remusat, Champollion, Klaproth, &c. This work attained a deservedly high reputation. Under the administration of Martignac, Balbi received from the government such pecuniary assistance as rendered his circumstances comfortable. He resided for some time at Turin, and afterwards at Florence, where others whose help he has scrupulously acknowledged, statistical tables of the kingdoms of France, Russia, and the Netherlands. After finishing his 'Abrege de Geographie,' he was appointed professor of geography at the University of Padua, where he made himself into one of the principal languages of Europe, he quitted Paris in 1833, and settled at Padua, where he died March 14, 1848.

We have mentioned the works on which Balbi's reputation rests, but he produced several others, among them are:

- 'La Monarchie Francaise compare aux principaux Etats de l'Europe,' 1828;
- 'L'Empire Russe compare aux principaux Etats du Monde,' 1829;
- 'The World compared with the Traders of the Great States.'

Balbriggan, county of Dublin, Ireland, a seaport and post-town in the parish of Balrothery, and barony of East Balrothery, is situated in 53° 46' N. lat., 6° 10' W. long.; and distant by the Dublin and Drogheda railway, which has a station here, 91 miles N. from Dublin, and 104 miles S. from Drogheda. The population in 1841 was 2922, in 1851 it was 2310. The harbour is formed by a pier of 200 yards in length, at the extremity of which is a lighthouse. Although dry at low water, the harbour has been found very useful as a port of refuge. The land of the district is very much the same, with the exception of some few large fields, which are most highly esteemed for the manufacture of distilleries and a brisk trade in the manufacture of cotton, and of a very fine description of hosiery. Many of the females are employed at the distilleries, and in the manufacture of the fishery, for which Dublin is the market.

The constabulary and the coast-guards have each a station here. Quarter and petty sessions are held, and there is a savings bank. Fairs are held on April 29th and September 29th.

Baldock. [Hawkinsianus.]

Ballina, county of Mayo, Ireland, a seaport and post-town, and the seat of a Poor-Law Union, in the parish of Kilimorey and barony of Tirywall (with the parish of Ardmore, in the parish of Kilimorey, barony of Tirywall, and county of Sligo, is situated on the Moy river, 7 miles above its embouchure in Killala Bay, in 54° 7' N. lat., 9° 10' W. long.; 159 miles N.W. by W. from Dublin. The population in 1841 was 7012; in 1861 the population was 8639 (being 4647 in Mayo, and 4005 in Sligo county); besides 1336 inmates of the Union workhouse. Ballina Poor-Law Union comprises 90 electoral divisions, with an area of 105,414 acres, and a population in 1841 of 127,354, in 1851 of 53,611.

The two bridges which cross the Moy at Ballina are in the county of Sligo and the northern baronies of Mayo. The situation is also favourable for the export of agricultural produce. The town is modern, well built, and clean. On the Mayo side are the principal church and a spacious Gothic Roman Catholic church, which serves as a cathedral to the Roman Catholic diocese of Killala. There are here a court-house, and chapels for Baptist and Wesleyan Methodists. On the Sligo side are the parish church and a spacious Gothic Roman Catholic church, which serves as a cathedral to the Roman Catholic diocese of Killala. A brisk trade is carried on in the export of agricul-
tural produce. There is a very productive salmon fishery. A few hospital and a dispensary are in the town. Ballylinne has a station of the constabulary force. Quarter and petty sessions are held; there are fairs on May 13th and August 18th.

The surrounding scenery is remarkably fine, having a fertile and very extensive plain towards the sea, bounded on the south and east by the range of the Oran Mountains in Sligo, and on the west by Nephin Mountain (3,646 feet), and the highlands of Erris. Ten miles north-east of Ballylinne, near the shore of Killala Bay, is the ruined castle of Lesaan, now called Castle Durbos, remarkable as having been the patriarchy of the ancient church of Ireland. It was once a residence of hereditary scribes and historians of the ancient Irish territory of Hy-Fiachra.

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

BALLYRIN, county of Mayo, Ireland, a market and post-town, and the seat of a Poor-Law Union, in the parish of Barrineau, and barony of Kilmain, is situated on the Rube River, 3 miles from its embouchure in Lough Mask, in 53° 27’ N. lat., 5° 22’ W. long; distant 141 miles N.W. by W. from Dublin, and 4 miles S.W. from Holywood on the leading road from Tuam to Castlebar. The population in 1841 was 2673, in 1851 it was 1012, exclusive of 2650 inhabitants of the Union. Ballyrinne Poor-Law Union comprises 18 electoral divisions, with an area of 144,888 acres, and a population in 1841 of 58,113, in 1851 of 37,255.

Ballyrinne is picturesque situated chiefly on the left bank of the Rube River, and in the union and townlands of Ballyrinne, Quinrhin, 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 6th. BALLYOTA, a genus of plants belonging to the native order of Liliaceae, the most remarkable species of which is B. tecta and B. tectorum. B. tecta is the most common plant, and goes by the name of Horehound. The White Horehound is the Marrubium vulgare.

(Maxwell's Irish Flora)

BALLYMENA, county of Antrim, Ireland, a market and post-town, and the seat of a Poor-Law Union, in the parish of Kirkinstol and barony of Lower Toome (with the suburb of Harreville in the parish of Ballyclug and barony of Lower Antrim), is situated on the right bank of the river Bann, 3 miles from its mouth in 54° 50’ N. lat., 6° 15’ W. long, 33 miles N.W. from Belfast by the Belfast and Ballymena railway, and 118 miles N. from Dublin. The population in 1841 was 5669; in 1851 it was 6136, besides 337 in the Union workhouse. Ballymena Poor-Law Union comprises 23 electoral divisions, with an area of 100,853 acres, and a population in 1841 of 74,130, in 1851 of 71,133.

Ballymena stands in the midst of a very densely-populated district, extending from the neighbouring town of Broughshane on the river Bann on the west. The population here unite the manufacture of linen with the pursuits of agriculture, and Ballymena is their chief market possessing a very considerable and flourishing trade both in linen and agricultural produce. There are two large markets a week, and a considerable appearance. There are an Episcopal, a 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 at the river Bann on the west. The population of the county constabulary, Saturday is the market day. Fairs are held on July 28th and October 21st. In the vicinity are extensive bleach-grounds. The surrounding district, although divided into very small holdings, is cultivated to a high degree, 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 Ballymoneey and barony of Upper Daniele, is situated on the left bank of the river Bann, in 53° 4’ N. lat., 6° 31’ W. long, 18 miles N.W. by N. from Ballymena, 54 miles S.E. from Coleraine, and 140 miles N.N.W. from Dublin. The population in 1841 was 4640; in 1851 it was 6656, exclusive of 373 in the Union workhouse. Ballymoneey Poor-Law Union comprises 33 electoral divisions, with an area of 137,115 acres, and a population in 1841 of 50,710, in 1851 of 42,418. The town is irregularly built on a small stream which runs into the river Bann. There is a Roman Catholic church, and the houses are mostly built of stone. It is a chapel for Roman Catholics, several chapels for Presbyterians, a town-hall, a dispensary, the Union workhouse, and a bridewell. Quarter and petty sessions are held, and there are here stations of the constabulary and the revenue police. Ballymoneey has a small trade in linens. A market for linens and dairy produce is held monthly, and fairs are held on May 6th, July 10th and October 10th.

(BALM. [CALLAMINTA, S. 1; MELMIRA, S. 1])

BALM, A. I. B.

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 Vendome, where young Balzac was sent early, he gained the character of an idle and disobedient 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. Between 1821 and 1827 he had published some of these, none of them exciting or deserving much attention, under the assumed name of Horace de St-Aubin. In 1826, in connection with one Barbier, he commenced business as a bookseller and editor. Among other things he published an edition of Fontaine's works, with which he had written himself, and commenced the 'Annales Romantiques.' His speculation was altogether unsuccessful. In 1829 he appeared before the public for the first time, under the name of 'The Last Chauve,' and the scene of which was laid in Le Vende, which district he had visited.

It was not however till the publication of his 'Peau de Chagrin,' in 1838, also under his own name, that the Parisians became acquainted with the talent which had 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 with new stories under the title of 'Comédie Humaine.' He planned a series of productions that was to embrace every phase of human society; and at this he worked for twenty years. Among the most popular were 'La Femme de Trente Ans,' and 'Le Père Goriot.'

On the publication of the 'Médécin de Campagne,' in 1835, Balzac received a complimentary letter from the Countess Eveine de Hanska, the wife of a Polish nobleman, possessing large estates in Russian Poland. Balzac replied, and an intimate correspondence between the two followed which his novel of 'Séraphita' 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 near the Champs-Elysées, which he adorning with a multitude of chefs-d'oeuvres of art, 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—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 eulogium over his grave. In that eulogy, he says, 'Balzac is a dead genius; he is no more; but his influence is felt. He is a voice in the heart of all men; a man of conscience, a man of feeling, a man of imagination, a man of truth, a man of kindness, a man of modesty, a man of humanity.'

(Nouvelle Biographie Générale)

BANAGH, county of Down, Ireland, a post-town in the parish of Reynagh and barony of Garrycastle, is situated in 53° 12' N. lat., 6° 54' W. long., on the left bank of the river
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 58 miles W.S.W. from Dublin by the high road. The population in 1841 was 5,292; in 1851 it was 5,864. The town is 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 skewed arch of 45 feet span for the passage of vessels, was erected in its stead by the Irish Board of Works. At the eastern end of the bridge is a barracks and a magazine, and there are batteries which command the bridge and its approaches on both sides of the river by Blarney, chiefly in the direction of Killarney and distillation. 

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 15th, 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.

BANBROOK, county of Down, Ireland, a post-town and the seat of a Poor-Law Union, in the parish of Seapatrick and barony of Upper Iveagh, is situated on the south 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 2852; in 1851 it was 3201, exclusive of 478 inmates of the Lunatic Asylum. The Bann Bridge Union consisted of 23 electoral divisions, with an area of 194,929 acres, and a population in 1841 of 87,100, in 1851 of 74,644.

The principal part of the town is built upon an eminence, having no streets leading towards the coast; and owing to this inconvenience, the centre of the main street, which was of 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 with its gardens 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 an open space with no built-up area, and is consequently the new market-house and church. The church is pleasingly 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 on the constabulary line.

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 neighbourhood. The line of the Bann, traversing the county, distant 6 miles above the town to the border of Armagh, forms an admirable level for the cultivation 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. Seapatrick also has a paper mill, which is about this a very early period. In the itinerary of King John, a.d. 1210, the place is mentioned under its present name.

FRAZER, "Handbook for Ireland; Original Communicating.

BAND-FISH. [Cephal.] BANFF.

BANKRUPTCY. The numerous statutes relating to bankruptcy have been consolidated by the Bankruptcy Act passed in 1847; and which has been amended in one or two omission, is c. 17, sect. 17. A class subject to these laws, traders, has been further defined 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, gazetted; there being an appeal to the Lords Justices of the Court of Appeal in Chancery, as coming in place of the Court of Review, and from them to the House of Lords. Meetings for the examination of the bankrupt, and for the debts and dividends. [Bankrupt, s. 1, p. 171], the property of the bankrupt is estimated in the mean time vested by the adjudication in an official assignee, and on a choice being made by the creditors, in him and his assignees jointly, the control of the Court being vested in such assignees for the collection or application of their estate. Companies incorporated by Charter or Act of Parliament (7 & 8 Vict. c. 111), insurance companies, and banking companies of more than seven partners (7 & 8 Vict. c. 112), 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., vii. 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 cheesepased by the statute 19 & 20 Vict. c. 79.

A similar observation on the subject of bankruptcy in Ireland. 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).
George Stannum, to whose son he had given lessons in mathe-

matics, the appointment nominally of comptroller of the

household to Lord Macartney in 1797 to go to China; but rea-

ly to take charge of the various philosophical

instruments carried out as presents to the emperor of China.

By this means Mr. Barrow secured so far the good-will

of Lord Macartney, that his lordship made him his private

secretary on being appointed Governor of the Cape of

Good Hope in 1799; and when Lord Macartney quitted the

Cape in 1798 he left Mr. Barrow in the post of ad interim-

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. At the time of his return to England he published

the results of his investigations in a short volume entitled

'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

administrations.

In this office Mr. Barrow was earnest and

indefatigable in the promotion of every project which com-

mended itself to his judgment as calculated to advance the

progress of geographical or scientific knowledge. Especially

indebted is he to the support of the scientific policy of the

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 sixty years of its reign over the

Admiralty; and though his services had been fully com-

memorated 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 office in 1844 he was presented

with a costly candelabrum, bearing a suitable inscription on

the pedestal.

Mr. Barrow was a man of uniting industry. The leisure

hours afforded by his official employment were devoted to

literary and scientific pursuits; and which literary labours in

what extent have seemed unworthy of one whose whole

time was given to literature. Neither in literature nor

science would he be regarded as having attained a high place,

but for many years he held a distinguished position in the

literary and scientific circles of the metropolis.

He was for a long period a member of most of the leading learned

societies of London. In 1805 he was elected a Fellow of the

Royal Society; in 1830 he took a leading part in the founda-

tion of the Geological Society; and in 1840 he was

chosen president. In 1835 he was created a baronet.

In the beginning of 1846 Sir John Barrow, then in his

eighty-first year, resigned his office at the Admiralty, and

retired to Bath, where he lived in the same mansion at Stew Hill, Bath, filling in

his apartments with a choice collection of scientific and

literary books, engravings, and other productions of taste and elegance. But

the decoration which he specially prized was a large fresco,

30 feet long by 12 feet high, which he painted upon the wall of one of the rooms: it represents the Inroads of the

Turks upon Scio, in April 1822, and is a most elaborate

composition. His friends and admirers describe it as the noblest

of his productions; but neither the character of his mind

nor his training as an artist qualified him for a painter of history. He died December 11, 1847, in the 79th year of his age.

BARRHEAD, Renfrewshire, Scotland, a small manufac-
turing town of recent growth, in the parish of Neilston, 3

miles NE. of Neilston, 10 miles NW. of Glasgow, and 3

miles E. of the Ayr Railway. It is connected with Glasgow and Ayrshire by the

Glasgow, Barrhead, and Neilston Railway. Spinning, weaving, and bleaching works are carried on here. The town, in addition to its neat railway station, possesses a chapel of ease and two meeting-houses, one for a congregation of the Free Church, and the other for United Presbyterians: the population of Barrhead in 1861 was 6000.

BARRISTER. [Barrister.] In order to be called to the

Bar of England it is necessary to pass an examination in the Acts of Parliament in

the Halls of the Inns of Court, which are delivered by Readers or Lecturers appointed by the Benchers for that purpose, or to pass an examination conducted by

Readers, who are paid partly by the Inns of Court and partly by the subscribers to the 'Biographical Memoirs of the University of Oxford.'

To encourage students to submit to examination,

three studentships or bursaries of fifty guineas are given

away annually to the student who has best answered the

questions of the examination.

In England, in preliminary education, the shape of

an examination in classics and arts, has been imposed on

persons applying for admission to the Faculty of Advocates.

BARR, SIR JOHN, was born at Drayage Back, near

Dover, Kent, February 11, 1805, and was educated at the Town Bank Grammar School, young Barrow was placed when about fourteen years old as clerk and overlooker in an iron-foundry at Liverpool, but quitted this situation two years afterwards to make a voyage in a whaler to Greenland, where he saw the sea-

way, and served as mathematical teacher in a school at Greenwich, when he obtained in 1792, through the influence of Sir

J. B. (John Barrow, son of the subject of the above article) and the Rev. W. B. BARR, M.A., D.L., among others, was born at Pembridge, Herefordshire, on March 16, 1802. The strong bent which he early manifested for scientific pursuits, led his parents to give him a mercantile life for their son, and he studied in the universities of Edinburgh, Paris, Berlin, and other places for three years, but returned to 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 to Chamouni, where, though past the middle of September, too late in the month, as he thought, for snow to have fallen on the summit of Mont Blanc. This was the sixteenth ascent, 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 Chamonix and the German Alps" into English.

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 in 1835 he published an "Account of the Development of the Viscera of a Frog," and in 1836 an "Account of the Development of the Ears of a Frog," which attracted much attention. He then, in 1837, published "On the Development of the Heart of Man," and in 1838 a "History of the Development of the Heart," which was received with great interest.

Having published in the "Edinburgh Medical and Surgical Journal" for 1836, a translation of the first part of Valentin's "Manual of the History of Development," he commenced his investigations into the development of the mammalian ovum and its parts. The results are, as is well known, "the most important part of embryological science." The results, communicated to the Royal Society of London, were printed in the "Philosophical Transactions," and in 1838 he published "The Development of the Ovum," which was received with great interest.

The Royal Society recognised the value of Barry's researches by awarding him his royal medal in 1836, and electing him a Fellow in the following year.

The "Researches in Embryology" exhibit proofs of the author's sagacity 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 bat. He describes the order of formation of different parts of the ovum, and the nature and mode of its growth from the ovum; and showed that the so-called "disc of Von Baer" contained a retinaculum, 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 until his paper appeared in 1836, was it known that the segmentation of the egg while the ovum was being observed in Batracian reptiles, was also true of mammals. It was an important discovery; and not less so that published in 1840—the penetration of the ovum by the rabbit, by spermatic or seminal fluid in the human being. When he 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 depicted the truth of Barry's conclusions, at last satisfied himself of their accuracy, and accepted them in full.

The views expressed by Barry in his paper "On Fibre," are opposed by physiologists. He attributes the power of muscular fibre and other organic tissues, and brought 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. What he 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; but he sought for his poor, chiefly as house-surgeon to the Royal Maternity Hospital at 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 examination of muscles, especially with results which may be seen in Müller's "Archiv." for 1850. In 1859 he returned to Scotland, suffering much from neuralgia; and having gone to reside at Bexley, in Suffolk, he died there on the 27th of April, 1855. He was a member of the Society of Friends.

Barry was a member of the Royal Society of Edinburgh, of the Wernian and other societies, and the College of Surgeons in that city. Some of his papers and translations appeared in the "Edinburgh New Philosophical Journal," and others in the works and 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 1800 he entered Pembroke College, Cambridge, where 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." His 'Muse and the Muse,' his 'The Captives of Weymouth,' and his 'Ode to the Muse,' were published successively. 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.

Bernard Barton attracted an amount of attention and popularity 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 known—more extensively than it had hitherto been. The evidently unaffected tones of simple religious earnestness which pervades all his writings. He wrote with ease; and like most easily written poetry, his verses are more characterized by fluency than power. But though often without philosophical, moral, or polished effect, they contain much of vividness and quiet 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 natural scenery, and a good talker, if his conversation was in no degree too much used beyond the common 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 received a valuable instrumentality for his son due to the grant of a pension of 100l. per annum. He died suddenly of apoplexy, February 19, 1849. Besides the works noticed above, Barton published "Napoleon and other Poems," "New Year's Eve," and "Household Verses," "New Year's Eve," and numerous occasional verses and poems published separately, and in magazines, annuals, &c.

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. During his tour, and during his residence in Athens, he made many drawings. While furnishing drawings for a castellated tower for Lord Elgin, he was employed in the construction of various descriptions of buildings, scarcely any one of which is without manifest evidence of care and attention. From 1816 to 1829 he resided at the close of his extensive work was broken up by the death of his wife, and the sale of his house. His last work was a town house, the sale of which was prevented by the death of the owner. He died, July 4, 1841. His work was the Fitzwilliam Museum at Cambridge, one of the most ornate yet chaste and effective classical edifices erected in England. Its external stonework is of unbroken beauty, and its internal arrangement of great skill. His death, and, like the Conservative Club-House, St. James's street, another of his latest works, executed by him in conjunction with Mr. Sidney Smirke, it shows that he was rapidlythrowingoffthetronnalsofprecedent, andgivinghis fine taste and attainments full scope. His reputation rests on the virtuosity of his own works, not on the vagaries of his predecessors. His career was suddenly cut short by a lamentable accident. While 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 slipped on a step, and he fellfrom the top of the tower. He was immediately notified, and sent in an ambulance to the hospital. He died almost instantly, October 16, 1845, aged 61. The Fitzwilliam Museum is now completed and opened under the direction of Mr. Cockerell.

BASSE. [Lanx.]

BASTIAT, FREDERIC, was born at Bayonne, June 29, 1801. He was the son of a merchant, by whom he was
ulty destined to a commercial career. After receiving a
good education at the College of St. Sever, he was placed in
his youth, entered into the mercantile world, and devoted
himself studiously to the study of the principles of trade; and,
having to visit Spain and Portugal on business in 1840,
he submitted himself voluntarily to the study of the com-
mercial regulations of those two countries, lodging behind
every town on the road, and the poor in outposts, but was
at length communicated to the public by M. Bastiat, in
1844. It appeared in the 'Journal des Économistes,' under
the title 'L'Influence des Tarifs Français et Anglais sur l'Es-
cyan des deux Peuples.' In this the author avowed himself
a protectionist. He called to mind the famous dictum of
Adam Smith—a principle at that time universally acted upon
in France, and almost as universally recognized as just and
credible. Bastiat, however, gained adherents, and time
and success resolved the principle into practice, for ex-
ample, of England, and France. (The Frenchmen in Eng-
land forward till they see something overtaken by the Frenchmen, and appear likely to be
extended still further. In 1846, after a visit to England,
where he had made the acquaintance of Mr. Cobden, he
unloaded, under the following title, many of the addres-
ses of the Free-Traders, preceding them by an introduction:—
Cobden and the League; or the English Agitation for the
Freedom of Exchange.' In this he adduced all the incon-
veniences of a prohibitory system. He became secretary in
Paris to the Free-Trade Union, member of the Committee of
Trade, and editor of a journal devoted to the same cause. While this
advocating sound commercial principles, he was opposed to the
principles of Socialism, and the pretended right of every one
to live at the expense of his neighbour. He was not set for some time in the Legislative Assembly, but his
health failing, he proceeded to Italy in hopes of improving it,
and died, at Rome, December 24, 1849.

M. Bastiat wrote many works besides those mentioned,
not all on the same leading subject. Though valuable and
worthwhile, it is not necessary to mention the names of the
works at the time of their appearance, they con-
tinue little that had not been before enunciated in England;
but the views, although not original, are placed effectively
before the reader."

(Notes paragaphiques Générales.)

BATHS AND WASHHOUSES, PUBLIC. In the
article Baru ['P. Cyp.; vol. iv. p. 31] it was said "There
are but few baths in London, and those established there
would not suffice for a small fraction of the population, if
bathing was a common practice. Still of late years baths
have increased both in London and England generally.

The baths here spoken of were private ones of a compara-
tively expensive character. There were indeed a few public
baths; but the poorer sort were not what they should be. The
houses of the laundress carried the linen down to the nearest
convenient spot by the side of a stream, where 'the shore
was shelvy and shallow,' like that which the whistlers (washers)
of Windsor resorted to, by Datchel Mead, where
Fawley was so unceremoniously snatched from the back-
to-bucket. It is on record that the Corporation of Reading,
upon the suppression of monasteries, petitioned for the
grant of the Frary in that town, for a town-hall, because
their old hall stood by the river Kennet, near the spot which
was used by the townswomen for washing clothes; and the
petitioners say in their petition that the noise of the
women's clappers caused great irritation to the transaction
of public business. The petty clappers were, in those populous
cities, washing in cold water, yet they used wooden bulldozers
to beat their clothes, just as the Blanchisseuses of the Seine
do still. In the present day, washing by the river-side is,
we believe, nowhere to be seen in England, but it is common
in many Continental towns. A few years ago it was well
known, that the Parisian laundresses pretty generally resort to washing
beats on the Seine. In Pepys's day, London families would
have to send their linen to be washed by their servants at
a washing establishment; for that most valuable of diaries
tags particularly well acquainted, they, the housewives
alone, "my wife and maids being over the water to the
whister's with their clothes, this being the first time of her
crying this way of washing her linen." Again he notes
(August 19th, 1668), 'This week my people wash over the
water, and so little company at home'; by which we may
suppose that Mrs. Pepys was satisfied with her trial of 'this
way of washing her linen,' as she continued to practise it
for above a year.

It 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
clearly saw that the sanitary improvement of the condition of
the poor was an important object of national policy, as a
degree of dirt and squarol with which health and morality
were alike incompatible. Many remedies for the evil were
suggested, and several carried into execution. One little
and far-tried mode of procedure would perhaps deserve
special attention to the matter of personal cleanliness.
It had been allowed by all who were really acquainted with
the houses of the very poor, that in their crowded and
wretched dwellings cleanliness was impossible. In such
places not only were there small means for 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
for washing and drying clothing could be obtained. A small
charge of one farthing per hour, or a trifling cost per hour, would be gladly
accepted by the classes most requiring such conveniences.

The movement was practically initiated by the building of a
lavatory in the Market House at Epsom, during the
presidency of the Lord Mayor, in September 1844; when
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,
old but spacious building, which had for some time been
completed by 'sleeping-baths for the houseless poor,' was rented
and converted into the first Free Baths and Wash-houses,
and opened in August 1846. A portion of the building was adapted,
as well 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 availed themselves
of the establishment was, in the first year, 27,662 bathers
and 36,677 washers; in the second year there were 84,584
bathers and washers. This, though the first establishment
was the kind in which the majority of the poor
very small having been previously started, and with
much success, in Liverpool, though without the knowledge of the
London Committee. The Glasshouse Yard establish-
ment was owed entirely to its founder, the Rev. Dr. Trench;
there was nothing extrinsic to render it attractive. It was placed
one of the worst spots in the metropolis; the building itself
was as little suited to the purpose as any building well could be;
the accommodation was of the most ordinary kind.
Yet it at once proved—if proof were needed—that the
poorest in that wretched neighbourhood would gladly be clean
when the means were attainable. In August 1846, a second,
and much superior establishment, was opened in George
Street, Eaton Square; a plot of ground having been liberally
offered by the New River Company, near one of their reservoirs,
with the additional advantage of a free supply of water
for the first six months. In the first year there were here
some 113,000 bathers and 20,000 washers. This establish-
ment, in which the baths are more varied in price than
elsewhere, still flourishes.

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 views. Although the building of Glasshouse
Yard was opened gratuitously, it had been desired that
the institution should as soon as practicable be rendered self-
sustaining by means of a small charge to each person who
used it. The committee hoped too, to see the system ex-
dended through the metropolis; and we do not see
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 tender estimates for the buildings, and 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, in fact, almost entirely novel, being 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 Baily, the architect, that a principal alteration has, indeed, been found necessary; in a recent 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.

In fact, then, these new arrangements 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 campanile in appearance. A brief sketch of the interior of any one will serve to give a general conception of all, it being understood that there are differences of detail in each.

The baths for males and females are on opposite sides of the building. As the men are by the washing-room, in some others by the plunging-baths. 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-lighting at night. The bathing-room is equipped with some of the most costly apparatus in the bathroom, and the water is carried off by water-pipes: an opening at the front of the machine shows when the water ceases to flow, and consequently the 'wringing' is completed, and the pressure of a lever at once stops the machine, and also mangles the clothes. The machine is then, by turning the tap, and without moving from her standing-place. The water in the boiler is made to boil by the admission of steam into it, which, as we said, the washer can do whenever she pleases. The ventilation is so arranged that the steam from each compartment is once drawn upward and carried off to the great ventilating shaft.

The Wringing-Machine is in effect a sort of wide but shallow colander, the sides, instead of the bottom being closed, having two long, slender handles, which are placed in such a manner that the meshes are about a quarter of an inch apart. When the wet clothes are put in this, 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, and as fast as the mangle is filled the last cloth is removed, and carried off by water-pipes: an opening at the front of the machine shows when the water ceases to flow, and consequently the 'wringing' is completed, and then the pressure of a lever at once stops the machine, and also mangles the clothes of the washers. Each division of the chamber contains a clothes-horse or maid, 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. A large dirty dress, weighing 9 lbs. 1 oz., on being washed, they weighed 94 lbs. 14 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 washerwomen, a quick eye and quick hands, can do as well when taken from the drying-machine 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 its great advantage in the economy of time, trouble, and expense, both 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, 1865. 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 shirts and stockings, was 36,844, belonging to 1373 washers, who occupied 2998 hours in washing, drying, and ironing them; and that the drying consumed only 282 bushels of coke, which cost under 4d.

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 roomy place; and as the charge for the use of the establishment has described is now generally 1 1/2d. an hour, though in a few places it is only 1d. an hour. Where there are both classes, the charge is 2 1/2d. an hour first-class, and 1 1/4d. second. Some establishments have a second and third class; and the number of washing compartments varies, of course, according to the size of the establishment; at Goulston Square there are 84 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 time in London; in some country towns it differs considerably. In
At this time he was alike opposed to Kossuth, 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 Stephen's, was named interior minister. It was in this capacity to maintain the political union between Austria and Hungary. After the invasion of Jellachich, and some fruitless negotiations with Austria, he resigned his functions on September 26, but on the next day he was commissioned to form a new ministry, but this effort failed. After the dissolution of the Diet, and the murder of Count Lambert, he repaired to Vienna to endeavour to prevent the ill-effects of this crime, and it is possible to form a new administration which was induced to request him to undertake necessary conveniences at a charge not exceeding 3d. for two hours. Baths and wash-houses of a higher class are to be charged as the council and commissioners may think fit. The baths and wash-houses “for the labouring classes” in any such establishment, must be not less than twice the number of those of any higher class. The Act at once gave the system a firm standing; and both brothels and parishes have availed themselves of its powers to a considerable extent. Of course, it is not always easy to persuade vestrymen to permit an addition to be made to their parochial rates for a purpose that does not promise advantage to themselves; but as it has become year by year more evident that these institutions may be made self-supporting, and in the event of a charge being made there is an increasing readiness to find them. In London and the suburbs, besides the Model Establishment in Soho Square, and that in George Street, Hampstead—new establishments are being provided in various parts of which are fitted up in an extremely complete manner, while all are well attended by both washers and bathers. Manchester and Liverpool have each several baths and wash-houses, and almost every other large town throughout the country is either providing or means to be provided with similar establishments; and the example has been followed by several of the smaller towns. Nor have the good effects of the movement been confined to this country. The progress of the appearance of a number of baths and wash-houses for the Labouring Classes, were at the end of 1853, to state in the Report before quoted, that the governments of France, Norway, and Belgium, the municipality of Venice, and the authorities at Hamburg, Paris, Munich, Amsterdam, Lisbon, and New York, had applied for, and been furnished with information on the subject; and in some of these countries the example of England has been followed in providing similar establishments for the labouring classes.

It is true that the institution has become firmly established. In London alone, the bathers number little short of two millions a year; while the washers exceed half a million. The constantly increasing number of bathers and washers shows that the demand is much exceeded in the growth of the population. The experience of twelve years has proved that, with proper attention and economy, the establishments may be rendered self-supporting; and the observations of all who have watched them in particular localities, vouch for their beneficial influences. The point in which they appear to have failed, is in reaching the very poorest. That portion of the community for whom the institution was primarily intended, seems to have been scarcely touched by it. Every class that has availed themselves of the baths, of a class above the poorest. The most profitable section of the establishment is found to be the “first class.” Whether making themselves of the hint, the managers of these establishments might not, by furnishing a yet higher class bath (though still at a moderate price), provide the means by which they might support one of a cheaper kind than they have at present been able to afford, and so extend the benefits of the system both upwards and downwards, is a question proper deserving of more attention than it has hitherto received.

BATHYANI, COUNT LOUIS, was born at Presburg in 1809. At the age of sixteen he entered the Austrian army as a cadet, and was stationed at Venice. He subsequently travelled through the country after the fall of the Austrian Empire, and in the winter of 1831-1832 visited Constantinople. On his return to his native country, he became at once a leader on the liberal side, a distinguished orator, and a favourite with the public. From 1839 to 1844 he opposed openly the Austrian chancellor Count Kossuth, in favour of Hungarian commerce and industry.
BEAUFORT, rear-admiral Sir Francis, K.C.B., F.R.S., &c., late hydrographer to the Admiralty, is the son of the Rev. Daniel Anger, Fellow of New College, county of Meath, Ireland, and author of a Map of Ireland, published with a memoir, in 1792, as well as of some theological publications. Francis Beaufort entered the navy, in June 1780, as a midshipman in the Channel. He was made midshipman 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 master of the Phaeton, was by the hawser under his orders a barge and two cutters, boarded and took the San Joseph, a Spanish polacre-rigged ship of 14 guns and 66 men, which lay moored under the protection of five guns of the fortress of Sanlúcar, near Malaga, supported by a frigate. Lieutenant Beaufort in this brilliant affair received a wound in his head, and several slugs in his body and left arm; but was recompensed by obtaining, as a recognition of his skill and courage, a commander's commission. During a cessation from service after, he was engaged from November 1800 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 returned thence to Plata, where he remained 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 1809 he was appointed to the command of the Melpomene, and the following year was made the rank of Post Captain to the command of the Frederickstein 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 Musulman by his men.

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 very closely connected to Admiral to devote himself to working out and embodying 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 subject: 'Karamania; or a Brief Description of the South Coast of Asia Minor, and of the Remains of Antiquity, &c., with plans and engravings.' His labours and scientific merits found their appropriate reward in his elevation, in July 1835, to the post of Hydrographer to the Admiralty, to which important office he imparted new honours, and to which his scientific duties, 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 Reid. Admiral Beaufort died in Dec. 1857. In April 1835, Captain Beaufort was appointed Commissioner for Inquiry into the Laws, &c., affecting Pilot; 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 Manuscripts and 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 Institute of France, &c., and was placed amongst the members of the Colours 74.

BEAZLEY, Samuel, architect and playwright, was the son of a surveyor in Parliament-street, Westminster, where he was born in 1766. In early life Mr. Beazley served as a volunteer, and went on his adventures in the Peninsula and set up for himself as a wholesale romancer. 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 this country. He also worked in Europe, where he gave the names of Pont-Claro and Pont-Granville. 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 he had made. In 1835, the year of his return, he appeared 'Proceedings of the Expedition to explore the Northern Coast of Africa, from Tripoli eastward, in 1831 and 1832'; the 'Voyage to the North Pole' followed; in 1831 appeared the 'Narrative of a Voyage to the Pacific and Behring's Strait'; succeeded by the Botany and Zoology of the same voyage, in two expensive quarto volumes. He had also been employed between 1839 and 1850 in surveying the coasts of South America and Ireland for the Admiralty of the Blue. He died November 26, 1856.


BELLLOT, JOSEPH RENE', was born at Paris, in March 1806. His father, who was in humble circumstances, removed to St. Nazaire when Joseph was five years old. Joseph was placed in the elementary school of that city, and so favourably a report was made by his schoolmaster at the close of his term of instruction, that the municipality at once granted him a bursary at the College of Rochefort. Here his progress was so steady that he was graduated at the end of his 16th year, and 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 it took rank as a 'lieutenant', but after six months in port, he received his commission as 'lieutenant de marine' on board the corvette Berceau, bound for the Isle of Bourbon. It is worthy of remark, as characteristic of Bellot's excellent disposition, that, before leaving France, out of his slender salary be assigned to his family the sum of 20 francs a month.

Bellot remained abroad somewhat over 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, the acquiescence and approbation of his superior officers. M. Romain Desfosses, 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 officer of the station, ... 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 distinguished himself, he was appointed an 'adjutant 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. Desfosses, he was raised to the rank of Sub-Lieutenant.

This raised his character, but not his rank. Bellot sailed in the corvette Triomphant 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 what part of the world he may belong. His strictly professional duties, and they were very onerous, 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 to come to regard as an important part of an officer's duties, that of learning the languages of the nations he did 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 party is one of the most important themes of the day. The nation desires that of Gar-Fish. It was placed by Linnaeus in the genus Ence, and being an inhabitant of the seas, it got the name of Sea-Fish. 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 this preceding the mackerel in their annual visit to shallow water for the same purpose, it has received the name of Mackeral-Guide. Its other English names, according to Yarrell, are Greenland, Horn-Fish, Sea-Fish, or Striped Salt-Water Fish. The length of this fish is about 24 inches. It has elongated jaws, beset with numerous minute teeth. The eye is large. The body is uniform in depth to the anal fin, thence tapering to the tail. The dorsal and anal fins begin and end near on the same level. The lateral line terminates on the tail, and the long external rays are nearly as long as those of the centre. The upper part of the head and back is of a dark
greenish blue; the sides and belly are silvery white; the pectoral, ventral, and anal fins white. This fish is taken off the coast of Norway during the mackerel season, and Dr. Johnston says it is not unfreqently 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 come in quantities. The flesh is considered of excellent quality, but it is difficult. Great numbers are said to be caught 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 at the surface of the water. Its gill rakers are of such a length that it will for a long time play about a flowing stream, 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 has great difficulty in tearing the fish from the hooks." The sword of this fish is used for a weapon.

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 in 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, some of which are said to attain the length of 23 feet, and to bite very severely. The Whale gar is the largest of these. The flesh generally is wholesome. (Yearrell, British Fishes: Cuvier, Reine du Animal.)


BENUTS. The fruit of Morinda pterogyposperma, from which Ben-Oil, much used in perfumery, is obtained.

BENICASAI, a genus of plants named by Savi, in honour of Count Benicassai, 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 glistening bloom. It grows in the East Indies. Lindsley, in the 'Vegetable Kingdom,' describes it as identical with Cucurbita pepo. Ainslie says that in the East it is presented at every native marriage feast, and is supposed to insure prosperity to the married pair.

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 Scott, was married to the late Lady 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 distinction. He was wounded at Waterloo, and the profound peace that followed was not calculated to open the way to any ambitious aspirations in that direction. He therefore, when his uncle Canning became secretary for foreign affairs in 1826, became his private secretary, for which he displayed 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 Aylesbury election, and 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. He was a supporter of what were called Whigs. He voted for Catholic Emancipation, but was not very warm in its favour. 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 president of the council, but he declined voting for the Motion 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 consequence 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 the bureaucrats, and which he at first supported; but when Peel moved a failure of confidence he retired. He himself repaired to Lisbon, where an attempt was made on 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, Bent at first attempted to organize the insurrection 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 at length, with the aid of the western states, he took Cracow, and repulsed the Austrian army, though joined by that of Russia, called to its assistance in the previous February. He also compelled the Austrian general, Puchez, to abandon the Banat and Wallachia. The Austrians then rallied; in attempting in vain to excite the Wallachians and Moldavians to rise, he was attacked and defeated at SEGEVAR by a greatly superior force under Lüders, the Russian general. He however succeeded in re-assembling his forces, and on August 8th he took part in the battle of Temesvár, in which the Austrian army was the first timeSelections from The Times.
of Sir Robert Peel's supporters; and when in 1846 he wholly repealed the Corn Laws, Lord George went into the most violent agitation. For some months he kept Lord George abashed 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 Sir Robert Peel for their candidate; but, having accepted it, he threw himself into the part with his accustomed energy in whatever he undertook. He commenced studying statistics, spoke on every possible occasion, he impeded the administration in their measures. But though clever, ardent, indefatigable, and too often unscrupulous, 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 years kept up 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 prerogation of the house in August 1846, he retired to Welbeck Abbey for relaxation; he however attended Doncaster races four times in one week, at which a race of his own breeding won the St. Leger stakes, to his great gratification.

On September 21 he left the house on foot soon after four o'clock in the afternoon, to visit Lord Manvers, at Thoroton. He was met there by the footmen at an appointed place. He appeared not; the servants became 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 about a mile from the house. At the coroner's inquest it was stated in evidence that he had been spasms of the heart. A lengthy life of Lord George has been written by his friend and follower, Mr. B. Disraeli, in *Svo, 1851. (Gentlemen's Magazine; Miss Martinus, History of the Thirty Years' Peace; B. Disraeli, Life of Lord George Bentinck."

BENTON, LONG. [Northumberland.]

BENZILE. [Chemistry, S. 1.]

BENZILE ACID. [Chemistry, S. 1.]

BENZOLE. [Chemistry, S. 1.]

BENZOL. [Chemistry, S. 1.]

BERANGER, 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 witnessed 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 printing office, and in 1805 he left Paris, returned to his father at Paris, and having attended some theatrical representations, resolved to attempt a comedy, and produced "Les Hermaphrodites." At eighteen he projected the work of a novel, but was arrested by the prosecutions of the time; in 1812 he composed the the "Theodore," and was in 1813 published in his work edited by M. Ferrotin and published in 1834. These performances did not improve his fortunes; and, reduced to great distress, he thought of proceeding to Egypt, where Bonaparte was then, and whose first successes had excited extravagant visions of glory and prosperity among the French population. The return, however, of some members of the expedition dispirited Béranger'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 Bontemple," "Le Roi d'Yvetot," and "La Lorraine," all of which were not immediately successful; but in 1830 he sent some of his poems to Lucien Bonaparte, who promised to ameliorate his situation. Lucien was suddenly called to Rome. Béranger thought himself forgotten; when a letter came from Lucien, asking him for his income as a member accepted the situation. He next obtained some employment as an editor, and in 1809 was appointed a clerk in the secretary's department of the Academy. His songs were now beginning popular in every quarter. During the 'hundred days' of Bonaparte, Béranger was appointed a member of the censor. 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 the châtelet. But in 1825 he published his third collection, and in 1826 his fourth. For this last publication he was again prosecuted, and was condemned to nine months' imprisonment and a fine of 10,000 francs. Confined more strictly in the prison of La Force, he employed himself in the attacks on the faults and follies of the government, and these remarkable lyrics aided not a little in accelerating the fall of the Bourbons.

In 1830 the revolution of July would have acted favourably for Béranger's fortunes if he would have given up his beloved independence. He says, 'I was treated as with one of the great powers; ' "nearly all my friends have become ministers; "unfortunately I have no love of sycophants, and my political works have been the cause of this." Béranger was convinced that France was not fitted at this time for a republican government, and he supported the establishment of a limited monarchy. In 1833 he published his fifth and last collection of songs, consisting of 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 rejected; but a week afterwards he renewed it, and it was accepted.

Béranger 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 contemporaries. He lived in a country villa in the suburbs of Paris, country, living quietly in retirement, and enjoying the society of a few friends. He died in Paris, July 16, 1857, and was buried on the following day in the cemetery of Père la Chaise, at the expense of the French government. Soon after his death Madame Colet published "Forty-five Letters by Béranger, and Details concerning his Life" (Quaronce-Quinze Lettres, &c.). In October, 1857, M. Lapointe published "Memoirs of Béranger" (Mémoires, &c.; in November appeared "Le Roi d'Yvetot" (Editors, &c.;); and in December was published "My Biography," by P. J. de Béranger ('Ma Biographie,' &c.). The songs of Béranger 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 indignant denunciation, the vivid and correct pictures, the frequent comicality of situation—are all truly and exclusively French; and so are the faults that are so frequently encountered in the same vein of the French language. It is marvellous, and in the most difficult 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 work of Béranger 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 endured, 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 "Le Roi d'Yvetot" and 'Le Sénateur'—it was laughed at and applauded even at court. Béranger is considered by his countrymen as a religious poet: this is not the impression which an Englishman would receive. But he certainly does not shock 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. He praised and indicted both in his "Roi d'Yvetot," and "Le Sénateur." Béranger 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 the fashions that jar on English feelings of delicacy. The passion he describes is indeed rather that which has become very common to the French, i.e., the contrast to our patriotic singer, Dibdin, is also striking. Dibdin holds out few incentives to the sailors he addresses beyond a sense of duty, prize-money, a picture of domestic happiness with their Nancys, and Greenwich Hospital. Such encouragements find no place with Béranger. The
glory of France is in the most prominent inducement to flight and to die. To our other lyrical poet, Moore, he has somehow what more resemblance.

**BERCHEMA**, a genus of plants belonging to the natural order Crambeaceae. Two species, *B. colchica* and *B. linifolia*, are used in medicine.

**WILLIAM CARR, VISCONTI**, 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 accident of his brother officer. In 1776 he served at Toulon, at Bastia, at Calvi, and in the West Indies under 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 and 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 6, 1811, he invested the fortress at Badajoz, and, after a series of brilliant actions, the battalions of Salamanca, in 1812, he was wounded. He then commanded a division under Wellington, and took a distinguished share in the battles of Vitoria and Bayonne. On the 10th of April 1814, he attacked and carried the heights before Toulouse, and bravely asserted that he had been created a Portuguese field-marshal, 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 1815; and after a short visit to Portugal, he repaired 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 measures 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 1826, in consequence of assisting in forwarding English troops for the support of Don Miguel, he was deprived of his rank as Portuguese field-marshall. In 1828 he married Louisa, his cousin, the daughter of the archbishop of Tuam, and the wealthy widow of Thomas Hope the banker, but left no issue. He died at Bedegbury Park, Kent, on January 8, 1844. At the time of his death he was governor of the Royal Military Academy at Woolwich, and curator of the island of Jersey.

**BERGERA**, genus of plants belonging to the natural order Amentiferae. *B. Königi* possesses stomatice and tonic properties, and an infusion of the leaves is used against vomiting. The green leaves are used raw in dysentery; the bark of the tree is used in the treatment of eraw.

**BERKELEY, a genus of Distomataceae, named by Greville, in honour of the Rev. M. J. Berkeley, distinguished for his researches in cryptogamic botany. It belongs to the suborder Convolvulales, and is characterised by having linear frustules included within tabular substationed cuneate siliceous filaments, which are free at one extremity, but have the other immersed in a gelatinous tubercle. *B. fragilis* is found parasitic on *Zoster marina*, and some of the smaller marine Algae on the coast of the Adriatic at Trieste.

**BERMONDSLEY. [SURREY.]**

**BERTHOLETTA. [MATERIA MEDICA, &c. 2.]**

**BERZELIUS (or BENZEL), JONS JACOB, one of the most distinguished of modern chemists, was born August 20th, 1779, at Wäsersunda, a village near Linköping, in East Gothland. Beyond the fact that he received the education of his learning from his father, who was parish schoolmaster, we have not any information of his early life. In 1799 he married Anna Charlotta, who died while his son was young and left him now nothing 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 dule lectures on chemistry delivered by Albrecht. Shortly after that time he commenced 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. At an instance of the way in which he was initiated into chemical manipulation, he used laughingly to relate in after life:—"Affelius first gave me sulphate of iron to calcine in a crucible, for the preparation of colorathor. "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 go home. I have little patience to sit for three hours together!" "Your next preparation shall be more difficult." On the next occasion I got cream of tartar to burn, in order to make pottas; which so disgusted me, that I vowed never to ask for any further employment from him. But he still continued to instruct me, notwithstanding his vow, and soon frequented the laboratory every day, although by the rules pupils were entitled to admission but once a week, his masters offering no opposition. Ekeberg was, however, vexed at times that the young chemist seemed to have no proper attention to his duties; and he said to himself: "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 1798, after two years' study, he left Upsal, and engaged himself as assistant to the physician-superintendent of the mineral springs at Medevi, a watering-place much resorted to by the nobility. Here he soon became nearly as well known for his chemical researches as for his literary studies. He analysed the waters, and in conjunction with Ekeberg published a 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, and so soon as he had found some employment for him, his Investigations 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 when Berzelius, taking up the subject, then worked together with Davy, men, materially widened his applications. His growing reputation gained for him, on his going to reside in Stockholm in 1805, the post of assistant to Sparmann, professor of chemistry, with the benefit of an allowance which he could use only during his second voyage of discovery. The amulets were so scanty that Berzelius had at times to practise medicine to eke out his resources. In 1806 he succeeded to the chair, and in the same year, jointly with Hisinger, he commenced the "Aphthander or Fynik, 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 was but a small part of what Berzelius undertook: 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 "extraordinary" by Dalton; and when Dalton published 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 I was on the point of becoming well acquainted with the eminent foreign savant," it became possible to control the results of 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 examination of solutions in 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 system of nomenclature for the elements of the Manchester philosopher. His knowledge of the laws of atomic 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 power and to swell the might of 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 subject of science then least understood. On the publication of the first volume of the Journal of Chemical Literature, which the following year he was admitted a member of the Royal Academy of Sciences of Stockholm. In 1810, being then at the age of thirty-one, he was elected President of the Academy; a
striking proof of the estimation in which he was held by his colleagues.

Bessel was called to England in 1819, and while here learned how prelections could be made really interesting as well as instructive by attending Dr. Marriott's lectures at Guy's Hospital.

In conjunction with Dr. Marriott he wrote a paper entitled 'Experiments on the Alcohol of Sulphur, or Sulphuric Acid,' which was published in the Philosophical Transactions for 1813; and in the same year he was elected a foreign member of the Royal Society.

On his return to Stockhelm Besselius at once changed his style of lecturing, and with the happiest results. His dry manner was changed into a more genial style, of which he greatly multiplied the number suitable for public exhibition by his quick imagination. Men whose names have since been famous attended his teaching. In 1815 he received the Regius Chair of Natural Philosophy and Mathematics at the University of Gottingen, and in 1818 he was chosen perpetual Secretary of the Academy, which distinguished post he held for the rest of his life. In the same year, at the coronation of Charles John, he was emboldened with permission, contrary to custom, to remain, to retain his name. In 1821, at the instance of the Academy, he commenced that series of annual reports on the progress of chemistry and physics, which, while contributing materially to the advancement of those sciences, confirmed and beautified their reputation. He was one of the few who did not change him with jealousy or envy, because of his intolerance of unsubstantiated theories. No theory was ever accepted or started by him that was not supported by a solid basis of fact. If 'too cautious,' as was often said, he studied but the foundations of science; and if it jealous, it was for chemistry, and not for himself. Regarding himself as a vidette ever on duty, he warned and alarmed whenever the occasion required, and confined in integrity, delivered his opinions with unqualified freedom. So faithful a censor will not be easily escaped.

In the hands of Besselius the blowpipe became a most important instrument in the analysis of inorganic substances. A translation of his treatise on the subject appeared in English under the title of A Treatise on the Blowpipe and its Application to the Analysis and the Examination of Minerals. There was a 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 gone through six editions, and as many translations. The last was published at Paris, in six volumes, octavo, in 1845-1850.

In 1833 Besselius resigned the professorship which he had held for twenty years, and returned to Germany, where he enjoyed the highest public estimation. He married about this time, and on the day of his wedding the king wrote to confer on him the dignity of 'Freiherr,' or Baron, observing that, "Sweden and the world were the debtors of a man whose entire life had been devoted to the benefit of his native country." Subsequently he had the further honour of receiving the Grand Cross of the Royal Swedish order of the Polar Star. The directors of the Swedish iron-works awarded him a pension, in acknowledgment of his eminent services to their branch of industry. And in 1836 the Royal Society of London showed their sense of his merits by giving him their Copley Medal.

The life of Besselius flowed on in a tranquil current. He enjoyed all the honours his native land could give, had the satisfaction of seeing his name enrolled among the members of nearly all the scientific societies of the world, more than 100, and of knowing that foreign governments recognised his worth. As he approached the age of fifty his sight began to fail, and his memory to lose somewhat of its power. Infirmities now increased on the philosopher, whose health had never been robust. He was seized with paralysis of the lower extremities; but retained the serenity of his mind till death approached, as one who said, after slow, sighing, "a messenger who regretted his errand," closed his career on the 1st of August, 1848.

His death was felt as a national calamity, and the scientific societies of his native land wore mourning for two months in respect for his memory.

Besselius died at Stockhelm at Midd. on the 32nd of July 1784. His father was a civil officer (justizrah) under the Prussian government; his mother a dervyman's daughter; and there being a family of nine children to rear, they 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 rated at the age of fifteen as clerk in a mercantile house at Hamburg. He then went to sea, and one of his main duties that lay immediately before him, whatever 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 stimulus; and to qualify himself for this responsible office he began to take up the rudiments of navigation and surveying. Besselius would have been a great mathematician, but for his early life thus engaged. On his return from his last voyage he had not yet completed his 18th year. He returned to Hamburg, and was employed by a merchant in the ordinary business of his calling; but on account of his mathematical attainments he was placed in charge of the calculation of the ship's accounts. His mathematical attainments brought him to a stand. Regarding the check as a call for greater exertions, he betook himself to a course of mathematical reading, and so interested did he become in this new study that the 20th year of his age was almost wholly devoted to it. There was no longer the same charm in 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 uses. With a rude wooden sextant made by a carpenter, and a common clock, he began to make time-observations; and having observed the occultation of a star by the moon, he got therefrom, to his great joy, an approximate latitude of Bremen. He then wrote a paper on the subject that form a point of departure for the student, repay his toil, and animate him to renewed exertions.

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 exalted above the courts of science, and he devoted himself to them, and pursued them after the close of business. The modern-day equivalent of Besselius's rough observations of the comet of 1607 had been found by Baron Zach, while searching the collection of Harriot's papers in the possession of the Earl of Egremont, and these being the first official observations of that comet since known as Halley's—One of the most important discoveries in the field of astronomy—It was at the age of 21, that Besselius was appointed as an assistant to Schröter at Lilienthal in 1806. He was now an astronomer to all intents and purposes; and well did he justify the anticipations of his friends. Not many years elapsed before his name stood among the foremost of modern astronomers.

One of his first tasks at Lilienthal was a series of observations on the sixth, or Hungarian, satellite of Saturn, with a view to determine the mass of the planet and ring, on which he wrote an able and elaborate paper (published in the 'Königssberger Archiv für Naturwissenschaften'), discussing all the phenomena of attraction and the disturbing causes. It formed a subject for examination in after years, when more perfect instruments were available. He observed also the comet of 1807, by which, on the publication of the elements with an examination of the perturbations, in 1810, he gained the Lalande prize of the Academy of Sciences at Paris.

Bessel was one of the few men who thought even in perfect observations without getting from them some direct practical result. He says of himself, in the preface to his 'Untersuchungen,' "that he at no time felt any special predilection for one rather than another particular branch of astronomical observation—of that very difference; but they were all alike work of the same kind—of one working always to an immediate and definite object." He held, that an observer who "failed to deduce actual results from observations, with a distinct view to the improvement of knowledge," neglected an essential condition of success and usefulness; and that a whole life exemplified his conviction.
The king of Prussia having resolved to establish an observatory at Königsberg, Bessel was appointed director in 1810, and devoted himself with unfaltering industry to the building and the 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 earnestness than a refuge from the world's distractions and the sorrows of war. Observations were published in the same year, and have been continued ever since with inconceivable benefit to practical astronomers.

Bessel married on a congenial home, Bessel married. His wife was daughter of Professor Hagen; he had by her one son and two daughters. And now, what he had done for the comet observations of 1807, he—also at Olbers' suggestion—undertook for Bradley's Greenwich observations, which, first published in 1776 but little known by the astronomers of the day. He had begun the task of digestion and reduction in 1807, and applying himself to it as his 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 yet, consistent with English modesty, during the twelve years' observations of Bradley. 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 heat, the diurnal motion, parallax, observation, processing proper motion, it contains a catalogue of the mean places of 3222 fixed stars, observed between 1750 and 1769, with the best instruments in existence at that time, and reduced to the epoch of 1765, with a precision and accuracy of which there was no previous example. It now furnishes 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 may be considered as the foundation of all the principal improvements which have been made in astronomy since the date of its publication." Schumacher's noteworthy remark, "One may almost assert that one exact and adequate 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 three years later of the Royal Society; and the scientific societies on the Continent hastened to enrol him among their associates. The king of Denmark conferred on him the order of the Dannebrog; and from his own sovereign, who was a steady friend, he received the order of civil merit and of the Red Eagle. He was appointed sea-captain and privy councillor; and the Berlin Academy awarded him his 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 the causes of the irregularities of astronomical instruments, leaving nothing unaccounted for, till he surpassed all his contemporaries in his knowledge of the theory of instruments. He was employed to determine the Prussian standard of length; and in connecting the geodetical surveys of Russia with those of 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 his observatory. Then, was his habit, taking the whole subject into view, he investigated the surveying of the British government in India and elsewhere, and of the French from the Belgian frontier to the Mediterranean, shrinking from no task that might aid in the accomplishment of his object. An error made in the French observations had been calculated and allowed for by four independent geometries; 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 alluded to, within an error of the order of the magnitude of the perpendicular.

At this time, he had completed a series of observations on the star 61 Cygni, to determine if possible the annual parallax of a fixed star—a task which had been the propitium of science. Thanks to his marvellous skill and delicacy of perception, he obtained results so perfect that the meteorologists, who is almost inconceivably small, only 31-100ths of a second, astronomers agree in considering them as demonstrated. By observations of other fixed stars, Sirius and Procyon, he himself authorised the announcement of minuscule irregularities in their motions as a positive astronomical fact. And he threw out a speculation as to the cause: namely, that the stars in question are double stars, of which one is not luminous; hence we see the disturbances, but not the double star.

A more trustworthy guide 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 as much profound research, as of an inordinate variety of attainments. His 'Table Regiomontana,' which may be regarded as a supplement to the 'Fundamenta,' &c., appeared in 1830. Nearly two hundred papers, neither short nor unimportant, in the 'Observations' and 'Astronomische Untersuchungen,' and, as is said, left a third in preparation. He was a scholar, a poet, and a scholar; and was esteemed and honoured 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 grief was felt, and a young man of great promise, who died in 1841, and the approaches of disease of a very painful nature upon the astronomer himself, stayed his inquiring spirit. His sufferings became more acute; and he died in his house in Berlin. He died on the 7th March, 1846, at the age of sixty-two.

BETEL-NUT-PALM. [Anac.] BETELM, SIR WILLIAM, was born in 1779 at Stradbrooke 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 Betham appears to have inherited his father's tastes, he had to carve out his own career. He was appointed in 1803 to the post of Secretary to a printer in London. His first literary employment was in the revision of the 3rd and 4th volumes of Gough's edition of Camden's 'Britannia.'

In 1805 he went to Dublin as clerk to Sir Charles Forte and the Bar. A few years later he became the deputy to Sir Charles; and he succeeded him as Ulster King of Arms in 1820. Mr. Betham 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 in itself of little emolument, but which placed under his control a large number of records, of which he availed himself to form an immense collection of historical and genealogical references extending to several hundred volumes, which has since served as an individual store-house in family, historical, and legal inquiries. Sir William also formed an index to the names of all persons mentioned in the wills deposited at the Prerogative Office, Dublin; a task which occupied a considerable portion of his time from 1807 to 1815, and extended to 40 large folio volumes. Sir William was like wise a diligent collector of old manuscripts connected with Irish history and antiquities; his collection was purchased by the Irish Academy in 1821.

Sir William Betham was elected in 1825 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 Tract Society. He was a zealous and cledulous antiquary, and some of his archeological and philological speculations were of a very singular and wholly untenable character. But a. most strenuous and indefatigable in his investigation of primate Irish, or rather Celtic, antiquities; and he fancied that he had discovered traces of the connected
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is of the Celtic races with several of the most remarkable
unities 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
the most important work of the period was 'Topographical
works,' the titles of which sufficiently indicate the
character of his notions: the first of these was entitled
'The Gael and the Celt.' In the 'Transactions of the
Irish Academy,' which have for the last years been
published weekly by the Council, he contributed a
series of communications in the 'Transactions of the
Irish Academy.' He was elected a Fellow of the Society of
Antiquaries, London, in 1855, but only two or three papers by him were printed in the
'Archaeologia.'

In his own line of research Sir William was a
most trustworthy guide. Besides several genealogical
memorials, and a valuable work on 'Parliamentary and
Feudal

Bishops,' Sir William published in 1834 an able and learning
book on 'The Origin and History of the Constitution of
Ireland,' of the early Parliaments of Ireland.' (In his

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Geography)

BROFAL [BOPAL]

BICKERSTAFF, ISAAC, was born in Ireland probably
about 1755. He was one of the pages of Lord Chesterfield,
who became Lord-Lieutenant of Ireland in 1746. A
fterwards he became an officer in the marines, in which service
he continued until forced to quit under circumstances of
a lightness which is known. He published a number of light comedies and musical pieces, under
Garriick's management, of which some yet remain in
the vaults of the stage. The principal are—Love in
York, 1763; the 'Maid of the Mill,' 1766; 'Love in the
City,' 1767; the 'Hypocrite,' 1768; 'Alistair and Clarissa,' 1768;
the 'Fellow,' 1768; 'The Captive,' 1769; 'He Would if
He Could,' 1769. His last piece, 'The Sultan,' was produced
in 1773. 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
from the continent, and died in obscurity. (Biographia
Draco.)

BICKERSTAFF, THOMAS EDWARD, was born March 19,
1766, at Kirkby Lonsdale, Westmoreland. He was the fourth
son of Mr. Henry Bickerstaff, a surgeon of that town, and
the younger brother of the late Lord Langdale, Master of the
Rolls. He received his elementary education at the grammar
school of Kirkby Lonsdale, but was removed thence to receiving a
schooling in the post-office, London, at the age of fourteen.
Here he remained for six years, when he was received into
the office of Mr. Bleasdale, a London attorney, as an articled
clerk. In 1785 he was admitted into partnership with Mr. Bignold, a fellow clerk, whose
father he married, and commenced business as a solicitor in
Norwich in 1812.

The business soon developed a flourishing one, and Mr.
Bickerstaff was extensively employed very favourably. But he
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-
lated. 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
had a considerable sale. He was a gentleman of strong
feelings, aided perhaps by an acquaintance he had formed
with Mr. Pratt, Mr. Budd, and some other leading clergymen
of the 'evangelical' section of the church, led him to desire
the ministry. The officials of the society, the members of which
gentlemen strongly encouraged. Accordingly, Mr. Bickerstaff
was, December 10, 1815, ordained a deacon of the Church of
England; the Bishop of Norwich having been induced to
dispensary in this case with the usual university
training, in conformity with the views of its being necessary
that those who entered the church should possess a
knowledge of the state in Africa, and to act afterwards as
their secretary. A fortnight
later 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 full discharge of the duties of his
secretaryship for the next fifteen years, organizing new and
visiting old branch associations, directing the studies of the
missionaries, continually advocating the interests of the
church in the pulpit and on the platform, as well as with
his own congregation. He also travelled 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 at
Whiter Chapel, Leeds, and again took up his residence at
Watton in Hertfordshire. At Watton, Mr. Bickerstaff spent
the remaining twenty years of his life. But his labours were
not by no means bounded by his parish. He was during the
whole of that period, a constant reader of sermons and
speeches, not only of the missionary, but of almost every other religious society connected
with the church, or in which, as in the Bible Society, and the
Evangelical Alliance (of which he was one of the founders),
churchmen and dissenters associate. And he also spent
some time 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 last years of his life Mr. Bickerstaff was
one of the most influential and generally popular clergymen
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
withdrawal; and he was equally zealous in denouncing the
Spanish ambassador, and the pretended atrocities of the
English people in South America; and yet his opposition was free from all personal
bitterness, and his influence was directed to softening the
aspersions of religious strifes. In his later years he
manifested 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 'Scripture Help' already
noticed, and a large number of sermons, tracts, &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. Peter,' 'A Treatise on Baptism,' The
Signs of the Times,' 'The Passion of our Lord Jesus
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 also mentioned a large work which he compiled, and
the 'Christian Family Library,' which he edited, and which
extended to fifty volumes.

Mr. Bickerstaff was in 1843 attacked by paralysis, the
result of too prolonged mental exertion. He recovered from
this, and resumed his labours. He then 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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Music. He 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 78. Sir Henry had heavy domestic trials, and he was not present at his more successful days, so that his later years were clouded by much anxiety and suffering.

Bishop was one of the first English composers of modern times. Had there been less he would have written better; but as it is, though few if any of his compositions are command to 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 to the centre of the science of harmony, and corresponded with many of the most eminent men of science. He died on February 18, 1856, at Venice.

BILLY OF LADING. The indemnity of a Bill of Lading now not only transfers the property in the goods therein mentioned, but also all the rights and liabilities inter se of the original parties thereto. It is also conclusive evidence as against the master of the ship therein mentioned (18 & 19 Vict. c. 111).

BILLY OF SALE. A Bill of Sale of personal chattels must be registered within twenty-one days after the making thereof in the judgment office of the Queen's Bench, otherwise it will, as against assignees in bankruptcy or insolvent, or creditors, be null and void (17 & 18 Vict. c. 36.)

BILLY OF SALE, a genus of plant of the order Dicotyledonae, after Billberg, a Swedish botanist. Several species are cultivated in our gardens. They are all natives of South America. One of the species, B. tinctoria, yields a colouring matter, which is used for dyeing in Mexico.

BILLY'S MACKINZIE. [MAN.] BILIMAN, the first order of the class Mammalia, which includes the single genus and species Homo sapiens—Man.

BILLYMON. [BARREL.] BISHOP, SIR HENRY ROWLEY, was born in London in 1780. He received his musical education under Signor Bianchi, who was then settled in London as composer at the Opera House. In 1806 Mr. Bishop obtained the appointment of composer of ballet music at the opera, a post he held for twenty years. In 1811 he added music director of the theatre to his title of composer. During this period he is said to have produced upwards of seventy operas, ballets, and musical entertainments. Of these many are forgot; but others are still repeated, and, on account of their flowing melodies and animated style, are now esteemed among the choicest works of the kind. Those which best illustrate his style are 'Guy Mannering,' the 'Slave,' the 'Miller and his Men,' 'Maid Marian,' 'Native Land,' the 'Virgin of the Sun,' the 'Knight of Snowdon,' the 'Englishman in India,' &c., in all of which there is true musical power. He also composed and adapted Mozart's 'Barber of Seville,' 'Marriage of Figaro,' &c., but the incessant calls upon him begot a hasty careless manner, and he frequently, in the later years of his connection with the opera, appears himself as conductor of the scores of foreign composers; and his fame in consequence gradually declined. At length, aroused by the production of Weber's 'Oberon' at Covent Garden Theatre, in 1826, he composed 'Aladdin' in direct rivalry to that famous work, and brought it out at the same time. During residence there, instead of trusting to his own genius, 'Aladdin' was a direct attempt in the German style, and it proved an entire failure. Mortified at his loss of popularity, he never again composed for the opera, and the few of his theatrical pieces, he composed about 1819-20. He arranged also several volumes of the 'National Melodies;' and he composed and arranged as the 'Melodies' subsequent to Stevenson's accession from that position.

Sir Henry Bishop was knighted in acknowledgment of his musical eminence by the Queen soon after her accession to the throne. He was one of the first directors of the Philharmonic Society, and conductor of the Concerts of Ancient
for several years. The position of this fortress as given in the 'Royal Geographical Journal,' vol. x., is 38° 23' 54'" N. lat. 45° 4' 49" E. long.; on the map in Dr. Leyard's 'Nineveh and Babylon,' the town is placed 3° 9' 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 numerous colours. In the 18th century these Mollauncas or Molluscans were famous for the brilliancy; 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 either from the Celebs or the Cossacks, and cotton goods (cotton also supply saddler), and some of it is imported from Khoj, in Permia. 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 deep, and a bright yellow mingles 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 unblesched calicoes, shawls, and prints; gay-coloured silks and satines, some woollen clothes and coarse cutely 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 Kuridh Begs, who were but little under the control of the Porte. Sherif Beg, the last of these lawless chiefs, was exiled to Constantino in 1849, after the so called | marks or apparent seals, and the names of the persons are added. Since then, the town is now governed under the Pasha of Musha.

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 Univalve. [MOLLUSCA.] Before the structure of the Cephalopod Animals was as 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 same name given by miners to the Sulphur of Vesuvius.

BLADDER, DISEASES OF. [See URETHRA, &c.]

BLAINVILLE, HENRY MARIE DUCROTAY DE, a distinguished zoologist, was born at Arques near Dieppe, Sept. 12, 1779, of a noble and ancient family. He went first to the military school at Beaucourt-en-Auge, being destined for the army; but left it suddenly in 1793, and, as is said, shipped on board a channel cruiser, and took part in some engagements with English vessels. Afterwards he enrolled himself at the École normale, and in 1802, received the conscription of 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 at the Collège de France, and at the École normale, where 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 1808, after three years of study; and chose as the subject of his inaugural dissertation, the influence of the eight pair of nerves in respiration, as demonstrated in the animal and vegetable王国. 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 2000 francs a year, and the great Cuvier was so impressed by his assistant's ability, that he intrusted to him 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 composed a treatise on animal physiology, on the analogy of the physiology at the Faculty of Sciences. Having won 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 connexion with the restorers of the Bonapartes, 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 Mollusca 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 Philomathique,' bear a 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 the annelids, and the molluscs. After the death of Madame Cuvier's Cuvier's death in 1832, he was appointed to succeed great anatomist as professor of comparative anatomy in the same establishment. Thus in twenty-eight years after his return from a life of scientific study, he found himself as the result of his rapid advance, in an eminent position, 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. He was also a member of other scientific societies on the continent.

De Blainville availed himself of his new position to commence what has since been recognised as his great work: 'Ostéographie, ou Description Iconographique comparée du Squelette et du Système Dentaire des Cinquante d'Animaux Vertébrés récents et fossiles,' &c. Twenty-three parts of this magnificent work had been published, and the author had corrected the twenty-fourth part ('Camelus'), when on the arrival at Rouen of a railway train in which he had taken a sleeping place, he was confronted by a later edition of this work. 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 no marks or approximation to all that he had done before, and which it seemed that nothing had been experienced during the year past, but, with a force of character peculiar to him, he had sought to conceal them from all, even from himself." All attempts at resuscitation proved unavailing, and he died a few minutes after his return from the carriage ride.

De Blainville's writings are to be found in the 'Dictionnaire de Histoire Naturelle,' the 'Bulletin' above-mentioned, the 'Annales' and 'Mémorials du Muséum,' the 'Annales des Sciences de l'École normale,' 'Revue Zoologique,' and other scientific periodicals. Of separate works, he may be remembered his 'Dissertation sur la place que la Famille des Ornithorhynques et des Echidnes doit occuper dans la Série Naturelle,' 4to, Paris, 1812; 'Sur les Ichthyolites,' &c., 8vo, Paris, 1818; 'Mammifères et Poissons de la France Française,' 8vo, Paris, 1820-30; 'Principes d'Anatomie Comparées,' 2 vols. 8vo, Paris, 1822-23; 'Mémoire sur les Bélénus,' 4to, Paris, 1827; 'Cours de Physiologie générale et comparée,' 3 vols. 8vo, Paris, 1833; ' Manuel d'Actinologie et de Zoologic,' 8vo, 1838.

The fact that De Blainville's writings number nearly 900 in the whole, will best give a notion of his activity and devotion to science; they comprise researches in all branches of zoology and malacology, and elaborate treatises which alone would employ the labour of a life. The former includes extant as well as living animals, and is of rare importance to palaeontologists.

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 'Osteologie,' the doctrine that the whole vegetable and animal kingdom are but the links 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 endeavoured to refer all groups and every variety of animal form to one and the same plan, 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 and simple structure, in which all 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."


BLAKE, a genus of plants belonging to the natural order Melastomataceae, named by Dr. Patrick Browne in honour of Martin Blake. The species are trees or shrubs, with

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large showy red flowers. The calyx is girded with from four to six broad scales; the corolla with six petals; the fruit a gourd-like ovary, with the 'Fawn' a, ovary-shaped from three to five nerves. B. quinquenervis, Aublet, B. tripinnervis, Linnaeus, is a native of Brazil, Guyana, and Trinidad. It produces a large yellow berry, which is eaten in the countries where it grows. B. parrasii is a native of Guatemala. B. divaricatum is a spreading shrubby plant, rooting itself in other trees. It yields a colouring matter, employed for dying red.

BLANCHARD, LAMAN, was born at Great Yarmouth, Norfolk, on April 15, 1827, His father having removed to London, Laman was educated at St. Olave's school, Southwark. He commenced the business of life as reader in a printing office. From boyhood he had exhibited a great fondness for poetry, and considerable aptitude in verse making; and his first ventures in this direction was a little volume 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 1837, 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, the occasional letter, and pointed personal criticism. The fact was most required for the magazine or 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 whole of the period of Constitution in 1832. He was a frequent contributor to 'The Court Journal,' and the 'Courier.' For some time previous to his death he had assisted in conducting the 'Examiner.' His death occurred under very painful circumstances. It is said that he was much distressed about a year before his decease, and his illness ended in insanity. He 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. In 1845 his daughter, Mrs. Blanchard, died. One of these, put an end to his life, February 15, 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. Belcher Lytton.

BLESSINGTON. [WITSCLOW.]

BLESSINGTON, MARGUERITE, COUNTESS OF, was born at Knockbrit, near Collen, Tipperary county, Ireland, on March 19, 1786. She was the youngest daughter of Mr. Edmund Power, who was of respectable family, but broken fortune and reckless habits. She was married in her twentieth year to a Captain Farmer, but the marriage was a very unhappy one, and Mrs. Farmer after a time separated from her husband. He was killed by falling from one of these, put an end to his life, February 15, 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. Belcher Lytton.

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years he held his important post, was much canvassed. But besides his watchful supervision of the general interests of the Church, Bishop Blomfield was a careful overseer of the clergy of his diocese, and prompt to support any proposition which appeared likely to improve the condition of the labouring classes in the metropolis. Nor in the briefest notice of Bishop Blomfield ought the amazing success of his efforts for increasing the number of churches to pass unmentioned. While Bishop of Chester he zealously set on foot the formation of new churches in the city properly supplied; but it is in his London diocese that success most splendidly crowned his labours. During the time that he held the see there were built in his diocese a number of churches remarkable rather than in the predominance of any other bishop since the Reformation; yet one of his most recent public acts was to make an earnest appeal, seconded by a large subscription, to the affluent and liberal to endeavour 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 population of the metropolis.

The theological writings of Bishop Blomfield consist of "Lectures on the Apostles," and of numerous Sermons and Charges. Bishop Blomfield in 1856 resigned his bishopric, and was succeeded by Dr. Tait. He died August 5, 1857, at Fullham, near London.

BLOODSTONE, also called Heliotrope, is a deep green stone—a variegated variety of quartz. It has obtained its name from being spotted with red so as to resemble drops of blood. In addition to silica, it contains oxides of iron and clay, which are responsible for its colour. Bloodstone is used as a gemstone and in jewelry.

BLOOD-VESSELS. These are vessels through which the tissues of the body obtain the material of their nourishment, conveyed from one part of the body to another by means of branched tubes which are named Blood-Vessels. It is carried along these vessels by the impulse given by the action of the Heart. [Veins.] The vessels which carry the blood from the hearts are called Arteries. [Artery.] Those which return the blood to the heart are named Veins. [Vein.] Whilst a very generally diffused net-work of Blood-Vessels exist, connecting the arteries and veins, which are called Capillaries.

The Blood-Vessels, whatever may be their ultimate destination, seem to originate in the same manner. Observations on this subject have been made by Schwann and Kölliker in Germany, and by Professor Paget in this country. The observations of Schwann and Kölliker have been confirmed by the experiments made in this country by Mr. J. M. Pointing. The method employed by the latter author is the same as that of Schwann and Kölliker. The time is now however come when the student will be enabled to form an impression of the internal structure of the blood-vessels by the use of the dissecting microscope. The blood-vessels of different parts of the body are of different sizes and shapes, and are found in different relations, according to the nature of the parts to which they are supplied. The blood-vessels are supplied with nerves, and these nerves are connected with the sensory nerves of the body. The blood-vessels are supplied with blood, and this blood is conveyed from the heart by the arteries, and returned to the heart by the veins. The blood-vessels are also supplied with blood from the veins, and this blood is conveyed from the heart by the arteries, and returned to the heart by the veins. The blood-vessels are also supplied with blood from the veins, and this blood is conveyed from the heart by the arteries, and returned to the heart by the veins.

BOERHAAVIA, a genus of plants belonging to the natural order Urticaeae. The species were formerly comprehended under the genus Urtica. One of the species, B. nivea, formerly Urtica nivea, is the Rheuma of Asam, and yields fibres as abundant and of equal strength and quality. They appear from the investigations of Dr. Falconer, that the plant which yields the celebrated grass-cloth of China is identical with the Asam plant. Several specimens of these fibres manufactured into light articles of dress were exhibited in the Indian collection at the Great Exhibition of 1851. The B. nivea is a herbaceous plant, with broad ovate leaves, which are downy and white beneath, hence its specific name. It bears no stings.

BOGORIA, a genus of plants named after the celebrated Borebava, belonging to the natural order Nyctaginaceae. The species of Boerhavia have generally emetic and purgative properties, and have been employed medicinally both by the natives of Peru and the East Indies, where the species known by B. tuba and by B. tuba americana. These plants are cultivated in Peru, and that it is employed as a culinary vegetable. The root of B. decumbens is called Hog-Meat in Jamaica, and on account of its emetic properties it is sometimes called Ipsecoacanha in Guiana. Sir Robert Schomburgk states, that this root is employed in dysentery. B. decumbens and B. hispanica are also said to possess medicinal properties. (Lindley, Vegetable Kingdom.)

BOG-IRON-ORE, a loose earthy ore of iron, consisting of Peridotite of Iron and water. It is of a brownish-black colour, and occurs in low boggy grounds.

BOGMARUS, a genus of Fishes, to which the Vasa, or Deel-Fish, is referred by Schneider under the specific title of B. Islandicus. [TASCYLYRUS, S. E.]

BOLDO, a genus of plants belonging to the natural order Monimiaceae. B. fragrans is the Boldo 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.

BOISSONADNE, JEAN-FRANCOIS, was born in Paris, August 12, 1774. Towards the end of the year 1792 Boissonade entered into the public service under the ministry of General Dumouriez; he was appointed aules-enregistreuse in 1795, but was restored in 1801 by Lucien Bonaparte, who was then minister of the interior, and who made him secretary-general of the prefecture of the Haute-Marne. He was a member of the council of the minister of agriculture, and was from 1808 to 1810 under the name of Duport, then retired; and thenceforward devoted himself to literature, which had indeed previously occupied nearly all his leisure hours. He had from the year 1802 contributed numerous articles to the periodicals of the day. In 1808 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. Boissonade then succeeded him, and he continued his professorship until 1830. His works include Inscriptions et Belles-Lettres. On the death of J. B. de Gaul in 1826, Boissonade was appointed professor of Greek in the Collège de France. Other situations of honour and emolument were afterwards offered to him, but he declined to accept any of them.

M. Boissonade occupied a considerable portion of his time in the critical examination of Greek writers previously unedited, and published a very large number of works and fragments of works by Philostratus, Proclus, Tiberius the Locrian, Holkentius, Herodesaurus, Dunapits, Aristaeus, and several others.

In the period from 1823 to 1826 Boissonade published in 24 vols. 32mo, a "Syllogon Posteriorum Graecorum," and in connexion with this work he published in 1839, in a monastery at Athens, of a manuscript which contained a large number of the lost Fables of Babrius. Boissonade published "Babri Fabule Iambiques," 8vo, Paris, 1844. [BABIUS.] Boissonade contributed to the edition of "Athenaeus" by
Schweighaeuser, to the 'Euripides' of Matthieu, and to the edition of Stephen's 'Thesaurus Græce Lingue,' which was published in London in 1694. He wrote several articles for Valpy's 'Classical Journal,' and he gave his assistance to the Paris edition of Stephen's 'Thesaurus,' printed by Didot. M. Boissonade was an indefatigable labourer not only in Greek but also in modern languages. He published several editions of the unedited letters of Voltaire, of the works of Parny, and having furnished a large number of the lives in the 'Biographie Universelle.' He died Sept. 12, 1857.

C. K. N. (Hered.)

BOLINGBROKE. [LONGMIRE].

BOLITOPHAGUS (Fabricius), Eleodora of Latreille, Leach, and Millard, and Opunturum of some other authors, a genus of Coleoptera Insecta, of the section Heterocera and family Carabidae. The principal species of the type, as follows:—Head short, partially hidden by the thorax, in the males sometimes armed with a horn or tubercle; antennae very short and thick, the three or four apical joints much broader than the rest; maxillary palpi rather large and distinct, the terminal joint truncated, its length equaling that of the two preceding joints; labial palpi small; thorax coarsely punctured or rugose, the lateral margins more or less toothed; elytra deeply striated; legs short and thick, the hind one long.

There are about six species of this genus known; they live in Bolati, and are of a small size, a short ovate form, and their prevailing colours are brown-black. In this country but one species has as yet been discovered, B. Aguacola or A. urticae, which has a brown-coloured body, about one-twelfth of an inch long. It is rather local, but where it does occur it is found in tolerable abundance.

BOLORENTITE. [CHEMISTRY. S. 2.]

BOLTANITE, a native anhydrous Silicate of Magnesia. It occurs massive with a granular structure, or in yellowish or bluish-gray grains. The cleavage is in one direction; the lustre vitreous; transparent to translucent. It is found disseminated through limestones in the United States of America, Massachusetts, and of ridefield and Reading, Connecticut.

BONA NOTABILIA. [EXTRACTS.] The doctrine of Bona Notabila has been abolished with the Courts whose jurisdiction depended on it, there being now but one Court of Probate for all England. [PROBATE, S. 3.]

BONAPARTE, CHARLES LUCIEN JULES LAUNCE, Prince of Canino, eldest son of Lucien Bonaparte, was born at Paris, May 24, 1803. He received a careful education, and always exhibited a much greater attachment to Rome than to his native Paris. As a naturalist the Prince of Canino acquired great distinction. In ornithology especially, he is generally regarded as one of the chief modern authorities; and he was elected a member of the Royal Academy of Sciences of Turin, of Turin, and of the Royal Institute of America. For some years the Prince resided in the United States, and it was by his writings on the Birds of America that he first made himself known to the scientific world. His chief publications are a continuation of Wilson's 'Ornithology of America,' in four folio volumes; and the 'Iconografa della Fauna Italiana,' a splendidly illustrated work in three volumes folio. But besides these he published numerous essays and memoirs on particulars of American ornithology, and on other branches of natural history in the scientific journals of the United States and Europe. The Prince was always the zealous friend and patron of the vocation 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 Bonaparte married at Brussels, June 9th, 1852, Zenaide-Charlotte, daughter of his uncle Joseph Bonaparte, by whom he had ten children, of whom three were alive.

BONAPARTE, LOUIS NAPOLEON, the fourth son of Charles Bonaparte, and father of Napoleon III., was born at Ajaccio in Corsica, September 21, 1778. At an early age he entered the French army, and accompanied his brother Napoleon to Egypt. He was distinguished himself at the passage of the bridge of Arcole, bravery of fire, and shielding the body of his brother and commander. When Napoleon became first consul, he was sent on a mission to St. Petersburgh; but on arriving at Berlin he learned the news of the death of the Emperor Paul. He returned to Paris after remaining at Berlin about a year, and became a general of brigades, a counsellor of state, and afterwards a general of division. In 1802 he married Horatia Anne de Beauharnais, the daughter of the Empress Josephine.

When Napoleon became Emperor, Louis Bonaparte was promoted to higher honours, and was made governor of Piedmont, and afterwards commanded the army of the north of France. In 1808, Napoleon sent him with 25,000 men into a kingdom, the states of Holland in June 1806 sent an embassy to Napoleon, requesting that Louis might be their king, which was granted, and he immediately assumed the title of Louis the First. He strongly exerted himself to improve the condition of his people, and distinguished himself on several occasions by his personal humanity. His love for his people occasioned him to refuse without hesitation the offer made him by his brother of the crown of Spain; but his refusal only made him more unpopular. He endeavoured to guard against any prejudice to their welfare, gave great dissatisfaction at Paris. His wife was a most attached adherent of Napoleon's, and her inability to control her husband, the death of her eldest son in 1807, and the state of her health, induced her to remove to Paris, where she died in 1809. She was afterwards sent by Napoleon in 1809 to induce Louis to comply with his wishes, but Louis refused. She then returned to Paris, where she resided as state in Queen of Holland, and in 1810, Louis Napoleon, with 300,000 men, agreed to his wife's proposal in favour of his son which abdication Napoleon rejected; and on July 9, 1810, Holland was united to the French Empire. Louis retired to Gratz in Styria, where he lived three years under the title of Count of St. Leu. Louis Napoleon became wholly separated from him, though not divorced.

In 1813, when the allied armies appeared about to fall upon France, Louis offered his services to the Emperor, by whom they were accepted, and he proceeded to Switzerland, but he was not employed by Napoleon, until the Dutch threw off the French yoke, Louis addressed a letter to the provisional government from Soleure, asserting his claims to the throne, but they were rejected, and he then commenced a suit at Paris for the recognition of his title, the residence of his two eldest sons, living in the service of their mother, who had obtained a grant of the domain of St. Leu, with the title of Duchess, through the interest of the Emperor Alexander. The return of Napoleon put a stop to the suit, and the Duchess of St. Leu did the honours of Napoleon's court, and used her interest in favour of the unfortunate of all parties. After the battle of Waterloo she went to reside in Switzerland with her sons. Louis retired to the Papal States, where others of his family had assembled, and devoted himself entirely to his service of his native country. He died at Clusel, near Nimes, in 1815. After the death of his father in 1824, and the return of his elder brother, Louis Napoleon wrote a History of Napoleon. He died at Lethem, June 15, 1846; and at his special desire, which after some delay was acceded to, his body was buried at St. Leu in France, with those of his father and his first son. September 29, 1847.

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 Red-Marl, 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 Silurian System.

BONGARDI, a genus of plants belonging to the natural order Berberidaceae, or Berberidaceae. [BERBERIDACEAE.]

BONHILL, a town in the parish of Bonhill and district of Lennox or Lennoo, Dumfartshire, Scotland. The parish is divided in its length into almost equal parts by the south
end of Loch Lomond, 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 Bonhill in 1851 was 2527.

The town is situated on both banks of the Leven, about five miles above Dumbarton. A mile nearer this town, and at the right bank of the stream, is the thriving village of Alexandria, with a population of 3781.

Bonnor had his workshop in print-works and bleachfields on the banks of the Leven, the water of which, from its softness and purity, is peculiarly fitted for the processes of printing and bleaching. Coals, lime, and other articles required in manufactures are brought up the river in large, well-built, roadway-bottomed lighters. 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.

Bonnor was the parish church of Bonhill 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.

BONTO, the name of fishes belonging to the family Scromenidae. They are particularly common to the island of Bonaire, a part of the Antilles. [Thynicus, S. 1.]

BOOTE. [CUMBERLAND.]

BOUILLON, a house of vases belonging to the natural order Hydrocharidaceae, the species of which are eaten as pot-herbs.

BORAGE. [BORAGI, S. 1.]

BORDE DE SAINT-VINCENT, JEAN-BAPTISTE-GEOFFRAY-MARIE, was born in 1780, at Agen, in the French department of Lot-et-Garonne. As early as his fifteenth year he had addressed some communications to the Annals of the Society of Natural History of Bordeaux. In 1799 he accompanied Captain Malte-Brun, a naturalist, in an expedition which was sent out to Australia by the French government. In the course of the voyage, however, a disagreement took place between the captain and several of the officers and scientific men who accompanied him, in consequence of which Bory de Saint-Vincent and others abandoned the expedition at Mauritius, then named the Île de France. He was employed by the governor as one of the rat-major of the colony, and provided with whatever was requisite for making a survey of the adjacent islands. His residence of which Bory de Saint-Vincent and others abandoned the expedition at Mauritius, then named the Île de France. He was employed by the governor as one of the rat-major of the colony, and provided with whatever was requisite for making a survey of the adjacent islands. His residence of which Bory de Saint-Vincent and others abandoned the expedition at Mauritius, then named the Île de France. He was employed by the governor as one of the rat-major of the colony, and provided with whatever was requisite for making a survey of the adjacent islands. His residence

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Placentas central
Leaves opposite
Leaves alternate
Placentas on the side
Stipules absent
1. Carpels more or less distinct
2. Carpels united
Placentas spread about
Placentas on sides
Petals definite, distinct
Petals indefinite, confused
Placentas in the centre
Leaves dotted
Ovary 1-celled
Ovary more than 1-celled
Leaves dotless
Petals numerous
Petals few
Petals narrow.
Petals round
Style 1
Styles separate

II. Ovary superior
a. Stipules present
1. Carpels more or less distinct or solitary
Stamens hypogynous
Carpel solitary
Carpels 0
Stamens perigynous
Styles coming from apex of carpels
Carpel 1
Carpels more than 1
Styles coming from base of carpels
Flowers hermaphrodite
Chromobalanaceae
2. Carpels united; placentas more than 1
Placentas on the side (parretal)
Leaves dotted, dots round
Leaves dotted, dots linear
and round, mixed
Placentas in the centre
Calyx imbricated
Flowers hermaphrodite
Ovary 1-celled; sepals 2
Ovary 2 or more celled
Calyx double
Calyx single
Calyx valvate
Stamens monadelphous; anthers 2-celled
Stamens columnar
Stamens not columnar
Stamens monadelphous; anthers 1-celled
Stamens monadelphous; anthers irregular
Stamens distinct
b. Stipules absent
1. Carpels more or less distinct or solitary
Carpels immersed in a disk
Carpels not immersed
Stamens perigynous
Stamens hypogynous
Embryo in a vitellus
Embryo naked, very minute
Seeds with an aril
Exarillate; albumen fleshly
Flowers hermaphrodite
Flowers unisexual
Exarillate; albumen resinated
Embryo nearly as long as seed
Calyx much imbricated
Fruit a legume
Fruit not a legume

B. vary wholly superior
a. Leaves stipulate

2. Carpels united; placentas more than 1
Placentas parretal, in lines
Anthers versatile; juice watery
Anthers insert; juice milky
Placentas parretal, spread over
the lining of the fruit
Placentas spread over disseminations
Placentas central
Sigma broad and petaloid
Sigma simple
Ovary 1-celled
Ovary many-celled
Calyx much imbricated
Leaves compound
Calyx simple
Petals equal to sepals
Seeds few
Petals numerous
Petals flat
Seeds numerous
Petals crumpled
Sigma little or not at all imbricated
Stamens perigynous
Calyx tubular
Stamens hypogynous; calyx many-leaved
Humiriaceae

II. Stamens fewer than 20 (Oligandroes).
A. Ovary wholly or partly inferior
a. Stipules present
Placentas parretal
Placentas in the centre
Flowers unisexual
Flowers hermaphrodite
Stamens opposite petals
Stamens alternate with petals
Leaves opposite
Leaves alternate
b. Stipules absent
Placentas parretal
Flowers unisexual
Flowers hermaphrodite
Placentas in the centre
Flowers in umbels; styles 2
Flowers in umbels; styles 3
Flowers not in umbels
Carpels solitary
Carpels strap-shaped; stamens distinct
Carpels columnar
Carpels not columnar
Carpels monadelphous; anthers 1-celled
Carpels monadelphous; anthers irregular
Carpels parallel, combined
Calyx valvate; petals opposite
Calyx valvate; petals alternate with stamens
Alangiaceae
(Nymaceae)
Rhamnaceae
Loranthaceae
Combrinaceae
Combretaceae
Hederaaceae
Anacardiaceae
Carpels divaricating
Leaves alternate; herbs
Saxifragaceae
Leaves oppo-site: shrubs
Hydrangeaceae
Rhamnaceae

1. Carpels distinct or solitary
   Anthers with recurved valves
   Berberidaceae.

Anthers with longitudinal valves
   Style from the base of the carpel.
   Style from apex of carpel; fruit a legume
   Leguminosae.

2. Carpels wholly combined
   Placentas parietal
   Flowers with appendages
   Calyx in a broken whorl
   Elatinaceae.

   Flowers without appendages
   Leaves with round and oblong transparent dots
   Leaves dotless, circular when young
   Leaves dotless, straight when young; fruit capsular.
   Leguminosae.

   Leaves dotless, straight when young; fruit siliquose.
   Moringaceae.

   Placentas central
   Styles distinct
   Calyx in a broken whorl
   Elatinaceae.

   Flowers unisexual
   Euphorbiaceae.

   Flowers hermaphrodite
   Illiciaceae.

   Petals large; stamens hypogynous
   Malpighiaceae.

   Petals large; stamens perigynous; leaves opposite
   Osmundaceae.

   Petals large; stamens perigynous; leaves alternate
   Saxifragaceae.

   Styles more or less combined, not gynobasic
   Tiulaceae.

   Calyx in a complete whorl
   Gynobase fleshy
   Ochnaceae.

   Gynobase dry; leaves opposite
   Zygophyllaceae.

   Gynobase dry; leaves alternate
   Geraniaceae.

   Calyx not beaked
   Oxalidaceae.

   Styles more or less combined, not gynobasic
   Calyx in a broken whorl
   Vochysiaceae.

   Flowers spurred; flowers not spurred, calyculate, flowers not spurred, naked.
   Chilenaceae.

   Calyx in a complete whorl
   Sapiudaceae.

   Leaves compound; sepals more than 2
   Scrophulariaceae.

   Leaves simple; sepals about 2
   Malpighiaceae.

   Leaves simple; sepals 2
   Portulaceae.

   Calyx varying or open
   Sterculiaceae.

   Stamens columnar
   Fabaceae.

   Stamens not columnar
   Rhamnaceae.

   Stamens opposite petals
   Hypogynous
   Vitaceae.

   Stamens alternate with petals
   Vitaceae.

   Anthers porous.
   Chalillocarpaceae.

   Anthers slit; petals split.
   Anthers slit; petals undivided.

   Styles absent
   Berberidaceae.

   Leguminosae.

Fruit a legume; radicle away from hilum.
   Commardaceae.

Fruit not leguminous
   Crasulaceae.

Carpels with 1 scale
   Carocephalaceae.

Carpels with 2 scales
   Angiosperms.

Carpels without scales
   Embryon in vitellus
   Embryo naked
   Albumen solid.
   Albumen apocarpous.
   Albumen small or none.

Carpels several
   Enclosed
   Calycanthaceae.

Carpels solitary
   Leaves dotted
   Leaves dotless
   Amaranthaceae.

   Anacardiaceae.

2. Carpels divided into a solid pistil

   Placentas parietal
   Stamens tetradynamous
   Cruciferae.

   Stamens not tetradynamous
   Flowers with sterile stamens
   Semitectum.

   Stamens and pistils on distinct flowers
   Pistil-flower crowned
   Papavaceae.

   Stamens and pistils not crowned
   Malesherbiaceae.

   Stamens and pistils together; placentas lining the fruit
   Oenotheraaceae.

   Stamens and pistils together; placentas in row
   Malesherbiaceae.

   Flowers without sterile stamens
   Disk of flower large
   Capparidaceae.

   Stamens indefinite
   Resedaceae.

   Disk of flower large
   Linaceae.

   Stamens definite
   Seed of flower small or none
   Papaveraceae.

   Stamens indefinite
   Albumen large
   Paeoniaceae.

   Stamens indefinite
   Calyx 5-leaved
   Turneaceae.

   Calyx tubular
   Framennsiaceae.

   Placentas covering dissipiments
   Nymphaceae.

   Placentas central
   Styles distinct
   Calyx valvate
   Viscaceae.

   Calyx in a broken whorl
   Rhamnaceae.

   Seeds hairy
   Brassicaceae.

   Seeds smooth; stamens polyadephous
   Hypericaceae.

   Seeds smooth; stamens monadephous
   Linaceae.

   Calyx in a complete whorl
   Saponariae.

   Carpels with a scale
   Carpathaceae.

   Carpels without scales
   Portulaceae.

   Calyx varying or open
   Saponariae.

   Stamens not arising from scales
   Saponariae.

   Styles united, gynobasic
   Styles combined; flowers hermaphrodite
   Rutaceae.

   Styles combined; flowers unisexual
   Xanthoyleaceae.

   Styles divided; flowers irregular
   Balsaminaceae.

   Flower regular
   Petals without appendages
   Acanthaceae.

   Petals with appendages
   Sapindaceae.

   Flowers papilionaceous
   Polygalaaceae.

   Calyx in a complete whorl
   L.
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<tr>
<td>Carpels 4 or more;</td>
<td>Estivation plicate;</td>
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<td>anthers porous</td>
<td>Convolvera.</td>
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<tr>
<td>Embryo in the axis</td>
<td>Ovules pendulous</td>
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<tr>
<td>Embryo at the base</td>
<td>Number of stamens</td>
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<td>same as petals.</td>
<td>Aquifoliaceae.</td>
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<tr>
<td>Carpels 4 or more;</td>
<td>Number of stamens</td>
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<tr>
<td>anthers slit</td>
<td>double petals.</td>
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<tr>
<td>Seeds winged</td>
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<td>Leafy</td>
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<td>Scaly</td>
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<tr>
<td>Seeds wingless</td>
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<td>Stamens united</td>
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<td>Stamens free</td>
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<td>Leaves dotted</td>
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<td>Leaves undotted</td>
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<td>Carpels fewer than 4</td>
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<td>Flowers unilateral</td>
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<td>Flowers hermaphroditic</td>
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<td>Sepals 5</td>
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<td>Sepals above 2</td>
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<td>Stamens hypogynous</td>
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<td>Seeds comose</td>
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<td>Seeds naked</td>
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<td>Ovules ascending</td>
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<td>Ovules pendulous</td>
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<td>Staminodes pendent</td>
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</tr>
<tr>
<td>Stamens perigynous</td>
<td></td>
</tr>
<tr>
<td>Ovules ascending</td>
<td></td>
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<tr>
<td>Ovules pendulous</td>
<td></td>
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<tr>
<td>Calyx in valvate or open</td>
<td></td>
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<tr>
<td>Anthers porus</td>
<td></td>
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<tr>
<td>Anthers slit</td>
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<tr>
<td>Stamens opposite petals</td>
<td></td>
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<tr>
<td>Stamens alternate to petals</td>
<td></td>
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<tr>
<td>Leaves pinnate</td>
<td></td>
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<tr>
<td>Leaves simple;</td>
<td></td>
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<tr>
<td>calyx tubular;</td>
<td></td>
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<tr>
<td>stamens hypogynous</td>
<td></td>
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<tr>
<td>Stamens free</td>
<td></td>
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<tr>
<td>Carpels distinct</td>
<td></td>
</tr>
<tr>
<td>Carpels combined</td>
<td></td>
</tr>
<tr>
<td>Ovules 1-5</td>
<td></td>
</tr>
<tr>
<td>Estivation imbricate</td>
<td></td>
</tr>
<tr>
<td>Sapotaceae.</td>
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</tbody>
</table>

Sub-Class, Monopterale. (Petals united into a Tube.)

I. Ovary superior.

A. Flowers regular

a. 3-4-5-sepaled

| Leaves dotted | Rutaceae. |
| Seeds wingless | Boraginaceae. |
| Inflorescence straight | Nolanaeae. |
| Corolla flat in section | Stackhousiaceae. |
| b. Ovary not lobed | |
| Carpels 4 or 5, or none | |
| Anthers porous | |
| Seeds winged | |
| Seeds wingless | |
| Anthers biporous | |
| Anthers uniporous | |
| Anthers slit | |
| Stamens opposite petals | |
| Stamens alternate to petals | |
| Seeds few | |
| Carpels distinct | |
| Carpels combined | |
| Ovules 1-5 | |
| Estimation imbricate | |
| Sapotaceae. | |

B. Flowers irregular

a. Ovary 4-lobed | |
| Lamiaeae. (Lam. | |
| 6. Ovary undivided | |
| Carpels solitary | |
| Carpels 2 | |
| Fruits capular or succulent | |
| Placenta parietal | |
| Seeds amygdaloid | |
| Fruit succulent, many-seeded. | |
| Fruit bony, few-seeded. | |
| Seeds not amygdaloid | |
| Leafy | |
| Seeds winged | |
| Seeds wingless | |
| Scaly | |
| Placentas in centre | |
| Albumen large | |
| Albumen none | |
| Seeds winged | |
| Seeds wingless | |
| Anthers free, central | |
| Fruits nucumanteus, 3-celled | |
| Anthers 1-celled | |
| Anthers 2-celled | |
| Fruits nucumanteus, 4-celled | |
| Radicile inferior | |
| Radicile superior | |
| Myoporaceae. | |

II. Ovary inferior.

A. Carpels single | |
| Anthers united | |
B. Ovary curved

Embryo curved
Embryo 1-celled; anthers many-celled
Embryo more than 1, but not 3 or 6-celled
Embryo straight
Embryo curved

B. Ovary superior
a. Stigmas absent
Flowers hermaphrodite

Sepals 2
Sepals more than 2
Carpels several, united
Placentas parietal, in lines
Placentas parietal, diffuse
Placentas in centre
Ovules few
Carpel short, with a gynobase
Carpel short, no gynobase
Embryo curved
Embryo straight
Calyx tubular
Carpel superior

I. Without a Calyx (Achlamydeae)

A. Stigmas present

Ovules numerous
Seeds winged
Seeds comose

Ovules solitary or very few
Flowers with stamens and pistils
Stamens unilateral
Stamens whorled
Flowers unisexual
Carpel solitary; ovules erect
Carpel solitary; ovules pendulous
Carpels trilocous

B. Stigmas absent

Ovules very numerous
Ovules single or few
Flowers hermaphrodite
Embryo in vitellus
Embryo without vitellus
Flowers unisexual
Flowers naked; carpel single
Flowers naked; carpel double
Flowers covered; anther-valves recurved
Flowers covered; anther-valves slit

II. Calyx present (Monochlamydeae)

A. Ovary inferior

a. Stigmas present

Flowers with stamens and pistils
Flowers unisexual; fruit in a cup
Flowers unisexual; fruit naked
Many-seeded
1-seeded

b. Stigmas absent

Flowers unisexual, in catkins
Leaves simple, alternate
Leaves simple, opposite
Leaves compound
Flowers unisexual, not in catkins
Seeds in a pulp

Seeds dry
Numerous
Solitary

Flowers hermaphrodite
Leaves dotted
Leaves not dotted
Ovary 3-6-celled
Ovary 1-celled
Embryo straight; cotyledons convoluted
Embryo straight; cotyledons flat
Albumen absent
Albumen fleshy

Chenopodiaceae.
Loranthaceae.

Carpel solitary
Calyx tubular
Calyx open
Carpels several
Carpel solitary

Mimaripaceae.

Carpels 2, divaricating
Carpels not divaricating; stamens hypogynous
Leaves opposite
Leaves alternate
Carpel solitary or separate
Carpels several
Carpel single
Anther-valves recurved, leafy
Anther-valves recurved, scaly
Anther-valves slit
Fruit a legume
Fruit not a legume
Calyx long or tubular
Base hardened
Tube hardened
Not hardened
Stamens embedded in sepals
Stamens not so
Ovules erect
Ovules pendulous
Fruit 2-valved
Fruit indehiscent

Aristochariaceae.
Corylaceae.
Bignoniaceae.
Aricarpaceae.
Myricaceae.
Garryaceae.
Juglandaceae.
Ocubirtiaceae.
Datisiacae.
Helwingiaceae.

Calyx long or tubular
Base hardened
Tube hardened
Not hardened
Stamens embedded in sepals
Stamens not so
Ovules erect
Ovules pendulous
Fruit 2-valved
Fruit indehiscent

Flowers unisexual
Carpels several, united
Ovules numerous
Stamens columnar
Ovules few
Leaves alternate
Dotted
Not dotted
Carpel solitary
Calyx tubular
Calyx open
Carpels several
Carpel solitary

Nepenthaceae.
Xanthorrhoeaceae.
Euphorbiaceae.
Myristicaceae.
Monimiaceae.

Embryo curved
Embryo 1-celled; anthers many-celled
Embryo more than 1, but not 3 or 6-celled
Embryo straight
Embryo curved

B. Ovary superior
a. Stigmas absent
Flowers hermaphrodite

Sepals 2
Sepals more than 2
Carpels several, united
Placentas parietal, in lines
Placentas parietal, diffuse
Placentas in centre
Ovules few
Carpal short, with a gynobase
Carpel short, no gynobase
Embryo curved
Embryo straight
Calyx tubular
Carpel superior

Dioscoreaceae.
Valerianaceae.
Lobeliaeaceae.
Columeliaceae.
Vaesiniaeae.
Campanulaceae.
Belliaceae.
Styliaceae.
Goodeniaceae.
Cinchonaceae.
Galaxiaceae.
Cephalotaxaceae.

Carnivorous.

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Carnivorous.

Carnivorous.

Carnivorous.

Carnivorous.
Embryo straight
Embryo curved
6. Stipules present
Flowers hermaphroditic
Sepals 2
Sepals more than 2
Carpels several, united
Stamens hypogynous
Placentas partial
Placentas central
Calyx valvate; stamens monadelphous
Partly sterile
All sterile
Calyx valvate; stamens distinct
Calyx imbricated
Not beaked
Not beaked
Stamens perigynous
Placentas partial
Placentas central
Leaves opposite
Leaves alternate
Stamens alternate to sepals
Calyx membranous
Carpels solitary or separate
Calyx membranous
Calyx herbaceous
Styles haste
Styles terminal, 1 to 3 on ovary
Carpel solitary
Stigmas ochraceae
Stigmas simple
Flowers unisexual
Carpels several, united
Flowers in cattins
Aril present
No aril
Seeds numerous
Seeds not in cattins
Bilicate
Bilicate
Embryo straight
Embryo hooked
Albumen present
No albumen
Flowers unisexual
Sub-Class, Dicotylyl (Lindley).

Ovary inferior
Ovary superior
Carpels distinct
Carpels united
Placentas central
Flowers 8-petalled
Flowers 3-petalled
Placentas below
Placentas on the sides

Sub-Class, Gymnosperms (Lindley).

Stem jointed
Stem continuous
Leaves pinnate
Leaves simple
Ovules in cones
Ovules solitary

Class, ENDOGENS.

1. Flowers complete (having distinct Floral Envelopes).

1. Ovary inferior
Flowers gynandrae

B. Ovary superior
Sepals calyx-like or glumaceous
Carpels separate, more or less
Placentas diffuse
Placentas narrow
Carpel in a solid pistil
Petals distinct from calyx
Placentas central
Placentas parietal
Petals not distinct from calyx
Flowers scattered
Flowers spadiceous

Sepals corolla-like
Carpels more or less separate
Seed solitary
Seeds numerous
Anthers turned outwards
Anthers turned inwards
Parts of flower 6
Parts of flower 2
Carpels combined
Petals rolled inwards
Petals not rolled inwards
Flowers with appendages
Flowers without appendages

II. Flowers incomplete (Floral Envelopes not distinct).

A. Flowers in glumes
Stems hollow
Stems solid

Carpel solitary; seed erect
Carpel solitary; seed pendulous
Carpels several, distinct
Glumes only
Cup within glumes
Carpels several, combined
Placentas parietal
Placentas central

B. Flowers, or with a few vertical leaves
a. Flowers on a spadix

Fruit a drupe
Fruit dried; leaves in bud
Convolute
Fruit dry; anthers clavate, on weak filaments

6. Flowers not on a spadix
Aquatic, with pendulous ovules
Pollen globe
Pollen convoid
Terrestrial; ovules erect
Aquatic; ovules erect

Sub-Class, Reticephal (Rhizanthae).

Ovules indefinite
Anthers opening by slits
Anthers bursting by pores

Ovules solitary

Class, ACROGENS.

I. With Stems.

A. No distinct axis of growth
Spores without elaters
Spores with elaters

B. Ovary straight
C. Ovary curved
D. Ovary superior
BOT

Sporo-case with valves. 
Jugurmannia

Sporo-case valveless. 
Marchantiacea.

A distinct axis of growth. 

Spero-case in cones. 
Liquistacoceae.

Spero-case without elaters. 

Spero-case on fronds. 

Rinjells. 
Polypodiaceae.

Spero-case on edge of frond. 
Ophioglossaceae.

Spero-case in an involucre. 
Moriillacoaceae.

Spero-case naked. 

Sensiile in the axil of frond. 
Lyginodiaceae.

Stalked. 

Valvcs. 
Adiantacese. 
(Musc.)

Without valvcs. 
Bryaceae. 
(Musc.)

II. Without stems.

Hymenium present.

Spero-in fours. 

Hymenium naked. 
Apgarssacoce. 

Hymenium inclosed. 
Lyginodiaceae.

Spero-case single. 

Sporules naked. 

Thallois obstate. 
Ureinnoceae.

Thallois close. 
Botryacoceae.

Sporules inclosed. 

In saci. 
Helebioceae.

In a veil. 
Mucoraceae.

Myxium absent.

Aquatic. 
Diatomeae.

Cellular or membranous. 

Fresh-water chiefly. 
Confernae.

Salt water. 
Speracoce.

Terrestrial. 
Cerameacoce.

Spero-case naked. 

Spero-case in saci. 

Thallois gelatinous. 
Collemacoce.

Thallois prulentulent. 
Parmelacoce.

It will be seen that many of the orders are repeated in the analysis under different divisions; and this arises from the fact that this analysis is artificial, and only expresses the general characters of the plants. This is, in the strong- est, not, exceptions to some very general points of structure frequently occur. Thus we have apetalous and irregular-flowered plants in the polypetalous regular-flowered order Alismacoceae. With a little practice such an analysis as the foregoing will enable any one acquainted with the structure of plants to refer any particular plant to its right order, and re-turning to the order in the alphabetical part of the work, he will find a detailed account of its structure and properties.

NOTOBRYUS. [Bryopt.] 

BOTTLE-GOURD. [LAGENARIA, S. 1.]

BOULDERs. Of the materials of which superficial de- pths of 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 are some of these boulders, and the obstacles such as interfering 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 in some sea, which as they have melted or 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 Bournmont, in Anjou, at the year 1773. Having entered the army in 1788, at the age of sixteen, he served as an officer in the Royal French Guards until 1790, 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 prince that he was immediately employed in fomenting the insurrection of the western provinces. In October 1792, he was despatched by the Prince to the head-quarters of the Viscount de Scépeaux, 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 inter- ests, and more particularly on the Viscount de Scépeaux. 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 against the Vendee, and to superintend the ad- ministration of the Chouans 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, asserted, great cruelties, pillaging the inhabitants of nearly a million of francs, burning the post-office, the public records, and the library in the Hotel-de-Ville.

About the period of the 18th Brumaire, when M. de Chaillot and other insurgent leaders found it necessary to submit to the civil government, the young captain de Bournmont followed their example. He strove to induce Georges Cad- doual to do the same; but that inflexible chief, far from complying,evinced his disgust at the proposal in 1801, by ordering Bournmont's brother-in-law to be shot. The active mind of the young soldier indisposed 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 strangled, and, having vanquished, he was advised to be considered sufficient proof of intended treachery, he sent 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 Besançon. Having escaped from this last place of confinement in 1810, he eventually returned to Portugal, where he remained for nine years. The French army having become masters of that country in 1810, Bournmont 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 sub- mission he was at Nassau 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, Bournmont 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, and made a lieutenant-general the following year. When the fall of Napoleon tested the character of so many generals and marshals, Bournmont only followed the example of an almost universal defection. He did not betray Louis XVIII. in 1814; but, ever true to the use of 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 was enough to carry him. But he could not brook the despotism manifested in the Acte Additionnel, and tendered his resignation to the Emperor in
of which was formed at Standley, in Staffordshire, in 1810. This body, which in 1811 had two preachers and about 300 members, was formed by a number of Wesleyan laymen, who were local preachers, and 7842 members. In 1853 the connexion numbered 1789 chapels and 3565 rented rooms, with 566 paid travelling preachers, and 9564 local preachers. The members at the same time had reached 108,936. The dissolution of the Primitive Methodist Connexion, which was the Prin-

BOW

consequence of it. Receiving no answer, he left the French
army on the 15th June, 1818, after fully communicating his
desires to General Gerard and to Count de Bovront, 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 Bovront from all implication of treachery ; whilst Napoleon,
who now, in his account of the battle of Waterloo, does not
even accuse him. After his second restoration, Louis XVIII.
gave Count de Bovront the command of a division, in the infantry of his
Guard, and in this rank he served in the campaign of
1823, under the Duke of Angoulême in Spain; and on the
return of the Duke to France, he appointed Bovront to the
command of the army of occupation. In 1829 the portfolio of
the ministry of war was offered to him by Prince Félignan,
but he refused it, and the offer savoured of the compliment
of his more general in preference to himself, and was only per-
suaded 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 Bovront. 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 attained
during the present century,—should have been the object of
so much enmity. The reverse of his fortune, distressing as that unlike, and after Bovront had been
suppressed in his command on the 2nd of September, by
General Cisnau, a course was brought against the defeated
leader, and the public was gratified to find him
in one of the captured towns. One of his sons had
fallen in the campaign, and the custom-house officer at
Martille, after the landing of Bovront, carried his seal to
such an excess, as to examine the corpse in search for the
hidden gold; but this outrage patiently, but the Countess de Bovront received so great a shock, that she
ever rallied afterwards.

From the year 1850 Marshal de Bovront lived in exile; residing a time in England, Holland, Germany, and other countries. He was at one time, and was afterwards in France by Louis Philippe, and in 1840 he took up his abode with his family at the castle of Bovront. Here he con-
tinued 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 Bovront 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 Marmont, has been so
famous. The early public denunciations against him are
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
strength of feeling much of that approbation which now
attaches to many of these great military men. But
the time to do it effectually is not yet past; and public
opinion must be respected even where it appears to

(Statistique des Contemporains ; Atlas, History of
Europe; Sarrut et Saint Edme, Notices; Feller, Dictionnaire
Historique.)

BOURNE, HUGH, the founder of the Primitive Metho-
dist Connexion, was born April 3rd, 1772, in the neighbour-
hood 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 associated himself with
William Clowes and some other preachers of the Wesleyan
body in reviving open-air religious services and camp me-
etings, or great gatherings for preaching and public worship.
Through these meetings, although conducted in the early
days of Methodism, and carried to very great lengths in
America, were disannounced by the Conference, which in
1807 passed a resolution to the following effect:—

"That this body does not wish to see any such meetings
(camp meetings) to be allowed in England, as they are held
improper in England, and likely to be productive of con-
siderable mischief, and we disclaim all connection with
them. This led to Mr. Bourne's separation from the
Wesleyan Conference, and the establishment of the Primi-
tive Methodist connexion, the first class or (local society)
archbishopal patronage," in great depression of spirits, 
Bowes 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 "Sonnetts" which first made him known 
as a poet. The "Sonnetts" 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 copy them out, and send them to Bowes, the printer, to 
have them, and have them printed. Accordingly, he got Mr. 
Cruttwell, printer of a Bath newspaper, to strike off a hun-
dred copies at 40, under the title of "Fourteen Sonnetts.," 
and the expense of this modest publication was 5l. About six 
months after the publication he received a letter from Mr. 
Cruttwell, informing him that the 100 copies were all sold, 
and that he could have sold 500. Much encouraged (his 
hair was just dead, and his mother was in somewhat re-
duced circumstances), he printed a second edition of 500, 
adding some new sonnet; and some time afterwards a third 
edition of 750 was called for.

It is curious now, looking back, to think, that, in a year like 
1789, when France was in the throes of revolution, the 
publication from a provincial press of "Fourteen Sonnetts,"
by a young clergymen disappointed in love, should have 
ever been an event of any consequence in England; and yet it 
was. A new literary spirit, and new notions of poetry, were 
beginning to show themselves. Bowes' sonnet was not aimed 
at anything fresh and natural, even if but feeble, after the 
strong and fine artificialities, as they are called, of Dryden, 
 Pope, and their followers. Bowes' sonnets came at the 
 a series of poems with a prose autobiography introduced, 
published in 1737, 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 the children of his parish. After 1789, Bowes 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 they 
were the same; one might observe the same sensibility to 
gentle beauties; the same appreciation of the grand, 
the same power of cultural expression which had 
distinguished his first sonnet; but it was felt on the whole 
that he was a kind of feebler Wordsworth, whose poetry, 
so long as he chose to write anything, was always to be received 
with respect and dipped into at leisure than eagerly read 
and appreciated.

But the whole virtue of Bowes' life did not lie in his 
poems. He was also a very busy prose-writer. If the list of 
his prose-writings is left out, he wrote a number of works 
to prove considerable versatility on the part of the author.
The "Poet and Pope's Controversy," which lasted from 
1819 to 1838, if indeed it may not date from 1807, when 
Bowes' editorial attack as it was published, has a permanent 
interest in our literary history. It is the first of the prose 
time, between the old or eighteenth century school of 
English poetry and the so-called new or nineteenth century 
school. Bowes, while doing justice as he thought to Pope's 
true excellences, had made some reflections on his moral 
character, tending to depreciate it; and had also, in an 
append ed 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 
these things are beautiful; 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 
less adapted to the higher species of poetry than those 
which are derived from incidental and transient manners.." 
Byron in his "English Bards and Scotch Reviewers" had 
pilloried Bowes for what he had said of the moral character 
of Pope; but it was reserved for Campbell, when preparing 
"Scottish Poetry," to make this the first distinct contradiction to Bowes' critical theory of poetry. 
Campbell vigorously defended the right of the world of 
the artificial to furnish images to poetry, and instanced "ships 
"like the tears of the sea" as an example of what images 
might be. Bowes replied in his "Letter to the Invariable 
Principles," etc. Byron, then in Italy, wrote home to Murray 
that he was going "to plunge into the contest, and lay about 
him like a dragon, till he had made manure of Bowes for 
the top of Parnassus." He accordingly sent over two spirited
BOY

letters for Pope and Campbell against Bowles, to which also Bowles replied. Other critics, including Octavius Gilchrist and the Quarterly Review, took up the question on Campbell's manifold merits as one after another, restating his real views in opposition to what he considered misrepresentations of them, and supporting these views by reasonings and examinations of the reasonings and examples of his antagonist. For some time he stood alone; but at last, Richard and the Blackwood's critics came to his assistance, and maintained that on the whole he had had the best of the argument. This view is now generally acquiesced in. Bowles never said anything so absurd as that Pope might not hold opinion, which has been ignorantly palmed on him by some who have engaged in the controversy; 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 poems of Pope himself, and pointed out the manner in which the more eminent of our architectural and landscape draughtsmen and engravers became acquainted for the execution of works of a higher grade in art. Mr. Bralyay himself contributed also to the progress of the fine arts in another direction. Having become acquainted with the late Henry Bone, R.A., who that artist was endeavouring to elevate painting in enamel to the position it subsequently acquired in his hands, as an integral and a legitimate branch of accepted pictorial art, he undertook the task of introducing it into the United States.

Enjoying repose in his old age after this battle, and looking round on such men as Rogers and Wordsworth as his junior coevals, and on younger poets rising in the room of the departed Coleridges and Southey's, and Scotts and Byrons, whose track lay within his own, and, a protracted life, Bowles survived to find himself almost forgotten in the midst of new persons and themes and interests. He had a presentation of this as early as 1837, when he wrote these words: 'Many years after my grey head shall have been laid at Bowes's feet, and his name has given place in the ranks of life, Bowles survived to find himself almost forgotten in the days of his eldest son so enthusiastically, may perhaps inquire Who was W. L. Bowles? The event thus anticipated came to pass on the 7th of April 1850, when Bowles died in the age of 88. His wife had died in 1844; and they left no family.

In his personal habits and manners Bowles was simple, genial, and kindly. He was also "famous," it is said, "for his Parson Adams-like forlornness." A life of him, the joint work of a relative and Mr. Alaric Watts, has been advertised as forthcoming; meanwhile we have gathered the above particulars from various notices, and from the autobiographical parts of his own writings. As we said at the outset, the subject is intertwined with interesting facts of some of his poems, particularly his Sonnets, and his Missionary and his Village Verse-Book, but with greater interest as a man occupying a position in our literary history entitling him in a manner to be called the 'Father of modern English Poetry.' If the designation is accepted, it must be allowed that he has had some very rebellious sons.

BOYLE. [Roscommon.]

BRACKEN. [Praslin, S. 1.]

BRADWIN. [Devonshire.]

BRAGHTIA, a genus of plants belonging to the natural order Aristolichaceae. One of the species, B. tenentos, is said by Dr. Horsfield to be intensely bitter, and to be used as a medicine in Java.

BRAIN. DISEASES OF. [Medicine, S. 1.]

BRAKE. [Praslin, S. 1.]

BRAKES ROCK, a common name for the Allisorma crispus, a plant belonging to the natural order Polyophytae. Allisorma is known by its nearly circular sori, which are at length confluent, and are concealed by the reflexed margin of the frond. A. crispus has a slender very brittle stem, which attains a height of from 6 to 12 inches. It grows in stony places on mountains throughout Great Britain.

BRANTFORD. [Canada, S. 1.]

BRAYERA, a genus of plants belonging to the natural order Rosaceae. One of the species, B. anthelmintica, yields the anthelmintic remedy known by the name Cassin, Cabot, or Sick's root. While the plant is anthelmintic, it is only known, it has only been recently introduced into Europe. The plant is a native of Abyssinia.

BRALEY, EDWARD WEDLAKE, F.S.A., a laborious and accurate topographer, was born in London (in the parish of Lambeth, St. Saviour) in the year 1725. He was apprenticed to one of the most 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 afterwards, to the study of the more congenial branch of professional literature. His acquaintance with Mr. Britton [Burton, John, S. 3.] had commenced before the expiration of his apprenticeship, and he also being desirous of exchanging a service occupation for the pursuits of literature, the two aspirants were associated in several 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.' The Beauties of England and Wales were the most eminent of our architectural and landscape draughtsmen and engravers became qualified for the execution of works of a higher grade in art. Mr. Bralyay himself contributed also to the progress of the fine arts in another direction. Having become acquainted with the late Henry Bone, R.A., who that artist was endeavouring to elevate painting in enamel to the position it subsequently acquired in his hands, as an integral and a legitimate branch of accepted pictorial art, he undertook the task of introducing it into the United States.

In the year 1825 Mr. Bralyay was appointed librarian to the secretary of the Russell Institution, Great Coram-street, the third in date and in rank of the literary and scientific institutions established in London, which had been founded after seventeen years before to meet the intellectual requirements of the populous superior middle-class suburb which was the growing up on the estates of the Duke of Bedford and the Foundling Hospital, on the north side of the metropolis. It was the third librarian in succession of the Russell Institution, the first having been the late Nathaniel Highmore, L.I. and M.D. of Jesus College, Cambridge (author of 'Jus Ecclesiasticum Anglicanum,' etc.). In this capacity Mr. Bralyay greatly improved the library, and conducted with ability the general business of the institution, but without following the pursuits of a topographer and antiquary. He produced several catalogues of the library (the last in 1849 which are not however remarkable in a bibliographic point of view, but which have been largely useful). The principle of the analysis of collections is carried. Having singular strength of constitution, neither the wear and tear of these united official and professional vocations, nor the progress of age, sensibly impaired his faculties, either physical or mental, for many years. His most extensive work, the exception of 'The History of Westminster Abbey,'
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The History of the Ancient Palace and late Houses of Parliament at Westminster,' 1836.

VISSARION HERBERT: - A Concise Account, Historical and Descriptive, of Lambeth Palace,' 1806.

BREAST, DISEASES OF. [SUSSEX, & C.]

BRIDGES. The requirements of railways have led, within the last few years, not only to the erection of stone and brick bridges and viaducts, of considerable and permanent character, but also to the construction of light and temporary bridges, such as the suspension, cable-stayed, or suspension bridge, which are useful as works of art, and interesting for their modes of construction, 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 constructed on novel or newly applied principles since the publication of the 'Penny Cyclopaedia' and 'Supplement.'

All the bridges we have to describe are applications of the girders. Crossing indifferently populous thoroughfares, 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 public safety. Hence, neither the direction nor the level of the way can be materially considered, and the space to be crossed must be left as much as possible unbroken by divisions. The problem for the railway engineer, therefore, was to span the widest area with the least practicable elevation upon it, and in the flattest form, was soon found to be unsuitable. The readiest mode was to return to the most primitive. One of the earliest artificial bridges, if not the very earliest, was no doubt a bridging, or girders, whether that was the trunk of a tree or a plank matters not, laid across the stream, which 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 purposes of architecture, and even showed the weakness of the beam, except within very narrow limits, and various methods were invented for strengthening it by the addition of diagonal and other bars or rods, technically known as bracings, stays, and trusses. Of these, trussed 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 Cyclopaedia' articles, Tausiano, vol. 25, p. 318; Roors, vol. 8, p. 8.

Trussed-girders were very early employed for crossing railways across wide streets and streams. Among other instances, may be mentioned the bridge which carried the Blackwall Railway across the Minories, London; and several others on the Eastern Counties Railway, and the North-Western Railway. At first, the girders were commonly made of cast-iron, flanges being added to give greater strength; but the fall of the cast-iron girder bridge over the Dee at Chester led to the abandonment of that material, and the substitution of wrought-iron. The best distribution of the material has likewise been made the subject of the most careful study, and the very ingenious and elaborate experiments which have been devised in the course of the searching and protruded investigations instituted, have resulted in placing in the hands of the engineer a body of formula, applicable to almost every purpose on which he can be called to exercise his skill.

The principal varieties of trussed girders which have been adopted for railway bridges are the trellised, the bow-string, and the hollow-beam, or tubular: the application of which will be sufficiently illustrated in the Crumlin and the Byne viaducts; the Chestporth and the Saltash; the Great Western; and the Britannia and the Victoria bridges. We shall also notice an adaptation of the suspension principle to railway purposes in the Niagara Falls bridge.

The Crumlin Viaduct was constructed from the design and under the superintendence of Mr. T. W. Kennard, to carry the Newport Abergavenny and Hereford line across the valley of Crumlin, in South Wales, and to connect the above line with that of the Taff Vale. With its approaches, the bridge is 3,304 feet long, the roadway consists of seven spaces, each of 150 feet span, the roadway in the centre spans being at an elevation of 200 feet. The
entire structure is of iron. The piers which support 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 24 feet by 13, and containing 140 columns, which are bound together by 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 network of wrought-iron ties and cast-iron struts, which 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 bolted to the main girders by a symmetrical pin, which gives a complete 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 138 feet each. The bridge is about 12 feet above spring-tides, 90 feet clear. It was opened in April, 1855.

The High-Level Bridge, Newcastle-upon-Tyne.—Under Roover, 'Penny Cyclopedia,' vol. xx., p. 147, a cut and description are given of the simplest form of low-and-string iron rail. The combined use of wrought-iron and cast-iron struts, the application 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 bow-string) girders are occasionally required, and the bow-string girders were early found to be peculiarly suitable. Among others 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 station, and a great stone viaduct, by which the North London Railway crosses the Commercial-road at Stepney; and one, of rather peculiar form, on the Gloucester and Birmingham Railway at Cheltenham. But by far the most magnificent bow-string girders are by railway engineers usually called bow-string girders, and 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 effected only by the construction of a very 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 Newcastle subscribers for a bridge, but a splendid 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. The bridge, which runs entirely across the railway, is a work of the celebrated engineer, and was begun in the year 1839.

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 about 1300 feet, and the river measures 138 feet. Four piers of massive masonry rise from the banks of 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. Either span or bay of the bridge is crossed by four main cast-iron arch ribs, with horizontal timber struts. These ribs are disposed in pairs—the two inner ribs being placed a span apart, and forming the carriage road; while between the inner and outer ribs is a space of six feet, which is used for foot passages. The upper, or railway, platform rests upon the arch ribs, and is carried by being supported on the wrought-iron rods. Each arch rib was cast in five segments, which, when put together, gives a span of 125 feet, with a rise of 18 feet. Besides the tier or tension bar, 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 spandrel pillars, girders extend lengthwise, from which others stretch at right angles across the archedrib. The whole has thus a perfectly rigid character, and is found to bear the heaviest weights without deflection. Altogether, this bridge is one of the finest engineering works of our time, though eclipsed in magnitude by the vast work, by the same engineer, which we are about to describe.

When the railway was opened, the bridge was to carry the Chester and Holyhead Railway across the Menai Strait, from Bangor to the isle of Anglesey. As the Menai Strait is navigable by shipping, the Admiralty Commissioners refused to sanction the construction of a bridge, and it was decided to make a canal for ships 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 centre, and only 50 feet 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 over 190 feet, the idea was abandoned, and intention, and boldly resolved to cross the channel by a girder bridge. He found a site about a mile on the Caernarvon side of the Menai, where the land is not only low, but also the banks of the river are very steep, and the whole stretch rises from a height of 140 feet. There seems to have been no such low land at the opposite end, but there is a slight rise from the river to 100 feet high, where the land is rather high. The bridge is to be commenced this year, and it is expected that, when completed, it will be a magnificent work of art, and a great addition to the utility of the country. It will be a very valuable addition to the transportation facilities of the northern part of England. It will be a very valuable addition to the transportation facilities of the northern part of England.
east and west towers respectively, and are constructed of massive masonry.

The towers: these presses, like many other parts of the apparatus, were larger and more powerful than any before constructed. The steam-engines of the time were so weak that the power each worked the presses; the presses gradually drew up the chains, and the chains carried up the tube; when the masonry was built up under the tube, the end of which moved within a groove left for the purpose in the tower.

The two towers were connected for the purpose of conveying water from the river. Two steam-engines of the time were placed across the bottom of the tower, with a connecting pipe between them. The whole was strengthened by arches, and the upper part of the tower was strengthened by arches, and the upper part of the tower was accordingly built of stone, so as to support the weight of the press and the equipment.

The first stone of the Britannia tower was laid in May 1846, on the 21st of October, 1850. Subject to the severest tests with trains loaded to the extent of 300 tons, the tubes did not exhibit a deflection more than 2 inches. They have now been subjected for more than seven years to the strain of traffic and the fury of the elements without any appreciable permanent influence having been produced upon them, or any perceptible increase of deflection.

The architecture of the towers is that of the Victoria Bridge, Canada.—A more remarkable bridge is to size and in many other respects than 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, near Montreal, and is expected to be completed in 1859. 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 length of the Britannia Bridge. It will be a single span of 400 feet, the length of Waterloo bridge, London. The tubes, which are similar in construction to those of the Britannia bridge, will be supported on 24 piers, of which 14 were completed in December, 1857. The abutments have also been completed for the tubes, and the whole will be of cast-iron. The length of the bridge is 245 feet, the central span being 330 feet, and 50 feet above the summer level of the St. Lawrence. The length of the bridge between the abutments is 6000 feet. The engineer is Mr. M. Ross.

Chepstow 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 supported by chains, the tension of which is resisted not in an ordinary suspension bridge, but by being transferred to a horizontal wrought-iron column or strut, 9 feet in diameter and 3 feet 6 inches in thickness, which rests on the towers at the ends of the bridge. The chains consist of three straight links only—its rigid form being maintained by the horizontal column prevented by vertical and diagonal bracings: the chain in effect is converted into the lower member of a rigid girder. The girders which carry the road have only two points of suspension, one at each end of the bridge, and they are provided for by the horizontal wrought-iron columns. These girders are 56 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 soil. The towers (in their present form as the foundations of Rochester bridge were formed), fresh cylinders being added as the previous ones sunk down. They were then filled up with concrete, and eventually carried up to a height of 190 feet, when they were bound together by the chains which attached to the horizontal ties.

A somewhat similar combination of the rigid suspension bearing with the tubular form is being carried out in Mr. Brunel's *Royal Albert Bridge*, at Salasah, near Plymouth, which is designed to carry the Cornish and Devon railway across the river Tamar, in order to connect it with the South Devon 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 up to a height of 126 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 it are of cast-iron. Each side was floated out on pontoons to a spot between 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 yet made to 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 above 820 feet, and the level above the water 245 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 in water was impracticable, and 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, also in form, 25 feet wide at the bottom, and 24 feet at the top, 18 feet high and 821 feet long from the centres of the towers. Along the bottom floor the ordinary passenger traffic is carried; along the top runs the railway. Separate systems of wire cables, two sets, each of 13 inches, are supported by three sets of roadway, 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 there are diagonal stays of wire above and below the floors. Fifty-six stays from the lower floor at the ends of the bridge are strung from the upper one to the rock.

Further, the cables, expansion and contraction from variation of temperature, high winds, &c., is needless to say careful provision is made. The railway traffic passes along the centre of the upper floor, the common waggons 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 the suspension principle for railway bridges, except under peculiar circumstances. In this case the river being un navigable, the engineer has been able to obtain stable rigidity by the use of an extended series of stays below the roadway, securely fastened by anchor chains on the bed of the river; of course in exceptional 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 unsafe to allow the passage of trains over it in less than three miles an hour. At that rate when a train of 326 tons is passing over it, the bridge only cambers to the extent of 10 inches, and the roadway assumes its original level immediately the train has passed.

Application of Suspension to Railways—The applicability of the suspension principle to railway bridges is about to be further tried by an English engineer. For some time this subject has been in various forms under investigation, and at the last meeting of the British Association for the Advancement of Science, before the section of Mechanical Science, in which he stated that the suspension bridge which he erected in 1862 over the river Dniester, at Kieff, in Prussia, and to the platform of which he gave great rigidity by a careful system of bearings and cross-beams, he had, amongst other things, which had been exposed, but had successfully withstood the severest tests in the passage over it of Russian armies with heavy ordnance during the recent war in the east.

As a result of his experience with his bridge on other inquiries, he had arrived at the conclusion that the adaptation of suspension bridges to railway purposes is quite practicable if the speed of trains when passing over them be moderate as compared with the ordinary speed on railways, to which end he has designed a girders bridge to be supported by suspension chains, for the purpose of unifying the Londonderry and Enniskillen and the Londonderry and Cole-raine railways. The importance of the question in a question of so acute as this will be well understood by Mr. P. W. Barlow, who is constructing a girders bridge, to be supported by suspension chains, for the purpose of unifying the Londonderry and Enniskillen and the Londonderry and Cole-raine railways. The importance of the question in a question of so acute as this will be well understood by Mr. P. W. Barlow, who is constructing a girders bridge, to be supported by suspension chains, for the purpose of unifying the Londonderry and Enniskillen and the Londonderry and Cole-raine railways. The importance of the question in a question of so acute as this will be well understood by Mr. P. W. Barlow, who is constructing a girders bridge, to be supported by suspension chains, for the purpose of unifying the Londonderry and Enniskillen and the Londonderry and Cole-raine railways. The importance of the question in a question of so acute as this will be well understood by Mr. P. W. Barlow, who is constructing a girders bridge, to be supported by suspension chains, for the purpose of unifying the Londonderry and Enniskillen and the Londonderry and Cole-raine railways.

*Foundations of Bridges*—To our notice of new principle in constructing the superstructure of bridges, it may be necessary to call the attention of our readers to one of the most important of 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 place the supports around the site of the pier, a soffit, or wooden waist, eight or ten feet in width, from which the water was pumped out so as to allow a firm and dry foundation to be laid;—this was a plan adopted at London and Waterloo bridges and in my 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 be used to carry away the water by means of an engine, only its proper level could be detached, the bottom or sides remaining as a foundation—this was the method used in constructing the piers of the old Westminster bridge.

[Editorial note: *Fenny Cyclopaedia,* vol. vii, p. 2894.]*] Coffer-dams and caissons were of course modified in form, according to circumstances, 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 of which should be equally durable, has long been desirous of being tried, and was eventually adopted by Sir George grosse, and is now being tried. Some of these have been successfully carried out in practice, as far as construction goes, where seems no reason to doubt their permanent stability in connection with the united country and on the continent, where so far from having been dispensed with. Piles and concrete, cast in situ
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 close to the level of the heavy capstones of granite to be fixed over the piers, concrete to be cast in position, 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 enclose the base, the two principal arches of the bridge. 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 in some 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 39 feet 6 inches below low-water line; the cast-iron piles, 10 feet in length, are driven 33 feet 9 inches below the same line, so that their heads stand somewhat above it; the 44 cast-iron plates or flat sheeting-piles, 15 feet in length, are driven down to 21 feet below low water, and to make up the height, they are surmounted by granite 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 caissons of the old bridge, and the caisson-piles are respectively 16 feet 9 inches, and 14 feet below that level. Sourthernly of the bridge, the bearing-piles intended to be provided by a solid mass of concrete round the pier; this concrete when set forming a kind of artificial rock, which is found to be harder than the granite of the old bridge, on which 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 direction at the feet of the piers, there 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 piers, and increasing at the rate of a rectangle, in depth there of about 12 feet; and he believes from his observation of the flow 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 sit up the entire cost of constructing the foundations of the new bridge on Mr. Page's system is estimated at about 60,000l. less than by the employment of coffer-dams. A peculiarity in the construction of the new Westminster bridge is that, in order to use the expense of the temporary wooden bridge when a new bridge is to be erected on the site of an old one, only one half of the bridge—the western—is in the first instance to be built alongside of the old structure, which is during its progress to be used for the ordinary traffic of the new bridge. The old bridge 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 doubtless have been constructed whether there is 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 entirely 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 original invention of Dr. 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's invention of the compressing of hollow cylindrical piles through sand by means of compressed air, to M. Triger, who thus sunk a shaft through a quicksand 65 feet thick, on the banks of the Loire. But the actual use of cylinders, which are known as diving-bells 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. Mllitchell. 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 Srood side 30 hollow cylinders were used; for the Rochester abutment 12; and for each of the two piers 14; making in all 72 hollow cylindrical piles, each 7 feet in diameter. The piers 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 consist of clay, sand, gravel, and 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 Srood pier a mass of hard stone, partly rock and partly original bridge, had to be passed through. The plan of sinking hollow cylinders by explosion 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 carried out in the following manner: each hollow cylinder into a diving-bell, by securely 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 of a casing of a casement). These doors, through which the workmen entered and quitted the cylinder, the excavated materials were passed out, and the brick and concrete passed in. Separate copses, one under the control of a workman inside, the other under the charge of a workman outside, permitted the passage at will of the buckets outwards or inwards, the filling of the chamfer with compressed air, &c. There was besides a great number of ingenious appliances for the convenience of the workmen intended to facilitate the various operations, which it would be out of place to describe here. The account is fully described and illustrated in Mr. Hughes's Memoir on the subject, and in the Supplement (1856) to Mr. Crasy'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 air-pump was continued by motion, 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 several strokes an additional quantity, until the density was sufficient to expel all the air that was above the 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 equilibrium, 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. The description of this process will be found in the Supplement (p. 1697). When the cylinder had 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-pump was again set to work, the excavations proceeded, the process was repeated, and the cylinder sank another 9 feet. These operations were repeated till the necessary depth had been reached, when the cylinders were filled up with brickwork and covered with mud. In the nine lengths of cylinder employed. The lowest remained unshaped; the one 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.

BRITTON, John, was born July 7, 1771, at Kingston-St. Michael, near Chippenham, Wiltshire, where his father was a small farmer, and kept a village 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, no doubt, expected little rudimentary instruction, and during his apprenticeship he had become extremely fond of reading, but his reading was desultory and aimless. On reaching manhood he was still uneducated, and the instruction he received from his master was rare and haphazard, &c., and at length adventured 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. Whaleb, its publisher, and to the connection thus formed Mr. Britton owed his introduction into the career which he so long and honourably pursued.

Mr. Whaleb, whilst residing at Salisbury, had issued the prospectus of a work to be called the 'Beauties of Wiltshire,' and he wished the author to make a tour for the purpose of procuring local materials. When, however, Mr. Britton's acquaintances was a young man named Brayley of about his own age, but somewhat better taught; they had assisted each other in their studies, and were prepared to enter upon a sort of literary partnership. In conjunction with his friend Brayley, Britton promptly undertook to get up from ready sources an 'Account of Wiltshire,' and as their first preparation for it, the friends set out on a tour, not, as might be supposed, through Wiltshire, but through Wales. In due time however 'Beauties of Wiltshire' were completed in 2 vols. Svo (1801), to the satisfaction of the publishers; and at their invitation the joint authors immediately set to work on the 'Beauties of Bedfordshire.' Brayley had long been familiar with the history and antiquities of the county, and Britton commenced in 1802, and were published in 26 vols., but only the first nine volumes were written by the original authors. [Brayley, E. W., S. 2.] While compiling his 'Wiltshire,' Mr. Britton not only became conscious of his deficiencies, but endeavoured resolutely to supply them; and he criticizes the ignorance of various antiquaries and topographers with whom the work brought him into connection materially assisted his progress. Finding his publisher averse to the admission of antiquarian matter, he began to collect materials for another and more elaborate work. At this period he also published the 'Antiquities of England,' of which the first part was published in 1806, and which was above nine years in progress. It eventually formed five splendid quarto volumes. Henceforth Mr. Britton's course was occupied with the exercise of his peculiar powers, as an enthusiastic authorship in the path which he made for many years in a special manner his own—that of architectural and topographical description and
antiquities. It would occupy too much space to enumerate his many publications, which in his own chronological list, is, to the best of our knowledge, the number eighty-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 in a detached form of the 'Antiquities of Salisbury Cathedral,' and was continued by Cradock, and was completed, and includes the entire cathedrals of England. In its completed form the 'Cathedral Antiquities' occupy 14 vols. fol. and 4to, 1814-35, with upwards of 300 highly finished steel-engravings.

The production of these works was carried out throughout a period of extreme impoverishment, many of the artists working in his own house, and being trained to their work by himself; and the facility he thus acquired in the production of this class of publications led to the preparation of many other, of which among the illustrated works of which he was either author or editor may be named—an 'Historical Account of Cromham House,' 1806; the 'Fine Arts of the English School,' 1810; 'Historical and Antiquarian Collections of the City of London,' 1820; 'Architecture of the Middle Ages,' 1822; 'History of the Ancient Palace and Houses of Parliament at Westminster,' jointly with E. W. Brayley, 1824; 1824-36; 'Historical Account of the Ancient Seis of Windsor Castle,' 1842; &c. &c. Besides these Mr. Britton wrote on many subjects connected with literature, either as distinct works or as contributions to literary journals, &c. In biography he published in 1844 'A Memoir of John Aurey,' and in 1848 an essay entitled 'The Authorship of the Letters of Junius Excidiat, including a Biographical Memoir of Colonel Barré, M.P.' Mr. Britton wrote the articles 'Avery,' 'Stonehenge, and the Druids,' and 'Tintagel,' for the 5th edition of the 'Encyclopaedia'.

In 1847 the literary and other friends of Mr. Britton gave the veteran author a dinner in his retirement from the active pursuit 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 organized to carry out the project. The form of the testimonial, at Mr. Britton's own suggestion, it was eventually agreed should be an 'Autobiography,' which he was to prepare to and print with the testimonial funds. Despite of his advanced age, Mr. Britton undertook the imposing task of collecting and preparing the parts of his 'Autobiography' 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 he gave the world a writer in a branch of literature which had been cultivated chiefly by minute 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 real and industry, with moderate talents, and without academic learning.'

BROCKVILLE. [Canada, S. E.]
BROMAL. [Chemistry, S. I.]
BROMLEY. [Abbots.]
BROMLEY. [Staffordshire.]
BROMUS, a genus of plants belonging to the natural order Gramineaceae, and the tribe Festucce. It has unequal many-mowed herbaceous glumes, the lower being 1-nerved, the upper 3-nerved. It is an essential species in wire grass, and is often a weed in various places. The outer palea short, (usually) founded on three spurs from below the tip. The styles below the summit of the fruit lateral. The sheaths of the leaves divide half way down. The species are generally brown or black, and are embraced in a series of elaborate illustrations of the plant. Four of the species are common in Great Britain. 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 palea being indistinctly 7-nerved and one-third larger than the smaller glume.

B. epur 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 thicket.

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

B. ciliatus is remarkable for its erect panic. It is a rare plant.

Some of the species, as B. purpurea and B. catharticus, are purgative, whilst B. mollic is said to possess poisonous properties.

BRONNYARD. [Herefordshire.]
BRONIGNART, ALEXANDRE, an eminent chemist and mineralogist, son of the architect of the Invalides, was born at Paris in 1770. He received a good education, promoted by his father's care, and the friendship of Lavosier and of the well-known Franklin; and in 1791, delivered a lecture on chemistry before he was fifteen. He pursued his earliest scientific studies at the Ècole des Mines, and at the École de Médecine. At the age of nineteen he assisted in establishing the Société Philomathique, and in 1795 he visited England for a scientific examination of the mines, and collecting minerals and rocks of Derbyshire. One of the results showed itself on his return to France by his publication of a 'Mémoire sur l'Art de l'Émailleur,' in which improvements were suggested. It was then between the year 1795 and 1797, that he came to London, who was chemical demonstrator at the Jardin des Plantes.

The requisition for military service which called every Frenchman to the front, Bronignart was attached as apostle to the army of the Pyrenees, and for fifteen months he served, which enjoyed during this period, without detracting from his studies of the botany, zoology, and geology of the country. Having however been suspected of favouring the escape of the naturalist, Bronsonnet, he was imprisoned; but the news of his freedom restored him to liberty. He returned to Paris, and was employed as an engineer under the Agency of mines. Next he was chosen professor of natural history at the École Centrale des Quatre Nations; and in 1800 he was appointed director of the porcelain factory at Sèvres, which latter office was afterwards given over to his pupil who was now known to be a gentleman of such learning and consequence as to be able to carry on the study of mineralogy and of chemistry with the best possible results.

In 1807, at the instance of the Imperial University, Bronignart published his 'Traité élémentaire de Minéralogie,' which is described as "one of the best, and in particular one of the clearest and most practical" then known. It became a textbook for lecturers; and it exhibits the originality and lucidity of the author in the early years. Pursuing his zoological researches, he studied the freshwater formations of Anverge, and revisited England to study the corresponding formations of this country. It was he who established the four divisions of reptiles, and he was the first who distinguished the class of birds, and the class of Ophidiens, by which they are now familiarly known. To him naturalists owe the name Trichôte, and a basis of classification for those singular Crustacea. It has been the starting-point for all subsequent works on the subject.

Bronignart's studies rendered him the congenial associate of Cuvier; he helped to classify the Montmartre fossils, and in 1810 appeared the joint publication 'Essai sur la Géographie Minéralogique des Environs de Paris.' It was reprinted in the following year, with important additions, and has since been recognized as the classical type of similar works. It confirmed Bronignart's reputation, and in 1816 he was elected a member of the Academy of Sciences of the Institute, and a foreign member of the Royal Society of London.

In 1817, accompanied by his son and one of his pupils, he made a scientific tour to Switzerland and Italy, during which, by his discoveries and generalizations, he strengthened his claim to be regarded as the legislator in fossil zoology. 'All the new results obtained were inserted in the third edition of the 'Essai,' published in 1822. In 1824 he travelled to Sweden, and with Berzelius for his companion and interpreter, laid down the first foundations of a classification of the fosse, and for the first time recognized that the earth was a memoir on the erratic blocks. He afterwards put forth his clear and ingenious views on volcanoes, particularly of Vesuvius, and an original memoir on the 'Ophiolithes of the Apennines.'

With all this activity Bronignart did not neglect his duties as director of the national manufacture of porcelain; his
journeys and labours to acquaint himself with the best pro-
ounced materials and methods would alone have sufficed to occupy
any ordinary man. The results of his long experience appeared
in 1845 in his "Traité des Arts Cinématiques." And carrying
out his earliest researches on enamelling, he revived at
Sèvres the almost lost art of painting on glass. He found
time and opportunity to share in the undertaking of edu-
cation, and in promoting the interests of science, and the views
of scientific inquirers. He died on the 14th of October, 1847.
Brounart was a foreign member of the Geological Society of
France, and other learned societies. His writings are to be
tion minérale de Roches mélangées," 1813; "Mé-
moire sur les Corps organisés fossiles nommés Tribolites," 1814; "Histoire Naturelle des Crustacés fossiles sous les Rap-
ports zoologiques et géologiques," 4to, 1822 (jointly with
Desmarest); "Introduction à la Minéralogie," 8vo, 1825.
Tableau des Terrains qui compose l'Ecorce du Globe," 8vo,
1839; "Premier Mémoire sur les Kaolins, sur Argiles à Por-
celaine," 4to, 1839; "Second Mémoire sur la Nature et les
Geo. Soc.)
BRONTÉ, CHARLOTTE (Mrs. Nicholls, better known by her pseudonym Currer Bell), was born April 21st, 1816, at the parsonage of Blackham, near Gisburn, Yorkshire, of which her father, the Rev. Patrick Bronté, had held the living. He afterwards held the living of Haworth, also in the West Riding, about four miles from Keighley. Mr. Bronté removed from Haworth to Haworth February 25th, 1820. Charlotte Bronté and her sister Emily, in February, 1842, 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 30th of November, 1842, Emily returned 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 pro-
gress in German, and returned to Haworth at the end of
February, 1843. The novel entitled "Jane Eyre," by Currer Bell, pub-
lished 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," published in 1846. 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 authorship, but as to the
name of the poet, the many separate letters of which were
bearing manifestly the traces of a woman's mind, yet the
general cast of thought, it was urged on many sides, was as
evidently feminine. The appearance almost simultaneously of
the same peculiarities of thought and general style, with the names of Acton Bell and Ellis Bell were their authors, served to stimulate still further the public curiosity, and when it was confidentially announced that Currer Bell was the daughter of a clergyman in a remote part of Yorkshire, and that Acton and Ellis Bell were her
sisters, there was a general feeling of surprise almost amounting
to incredulity. In truth, "Jane Eyre" is a remarkable work, and as the production of the daughter of a country clergyman, it was to be still more remarkable if it were as unnecessary as it sometimes appeared to be composed, to provide acquaintance with society to obtain 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 morbidly keen dissection, of character and 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 interest.
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. It came to an end at Haworth, on the 18th of December,
1849, of diseases which she had survived for years. The
director of the three gifted sisters, and in fact of all her father's
children. Emily Bronté (Ellis Bell), the author of "Wuthering Heights," and next to Charlotte the most gifted of the
sisters, died Dec. 19, 1849. 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, across the street
where her parents had lived, and where one of her sisters, in the
crowded but quiet churchyard there. In 1857 appeared "The
Professor, a Tale by Currer Bell," a novel written in 1848, but
left aside and much of it recast to form "Jane Eyre." The
whole of Currer Bell's works, 8vo. 1867, have been published
by Mrs. Gaskell. BRÖSS.EA, a genus of plants, belonging to the natural
group Ariceae. The fruit of B. cocciinea, like that of Gaul-
theria procumbens and Arctostaphylos alpina, is succulent and
covered with numerous seeds. 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 longevity may
be attributed the marked distinction into which the whole system of
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. [Broussais, Louis, 1814-1888, French physician, who was the first to introduce the use of chloroform as an anesthetic. Although 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 led to the introduction of the suspension-bridges. They were generally regarded as insecure, except for crossing narrow
streams, until Brown introduced his improved method of con-
structing 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-pins. He made a model of his invention
in 1813, having however designed and prepared specifi-
cations for suspension-bridges much earlier, but he did not
obtain his patent till 1817. Brown's plan was soon after
adopted in principle by Telford (who had been in the first instance
proposed to use cables of merely the ordinary construction) in the
erection of his magnificent bridge over the Menai Strait.
The first extensive bridge erected wholly on Captain Brown's principles was at Berwick, in which the length of the chord-line between the
points of suspension is 449 feet; it was opened for use in
July 1829. In 1831 Captain Brown commenced the con-
struction of Trinity suspension-bridge at Newmarket, near
Edinburgh. He subsequently erected several other bridges and
pier, but it may suffice to mention, as his great work, the
suspension-pier at Brighton, which consists of four open-
ing of 25 feet each, with a deflection of 18 feet. The
Brighton pier has suffered considerable damage on two occa-
Sions in severe storms, but, as subsequently strengthened, it
has successfully withstood others of excessive force.
Captain Brown was knighted in 1833. He died on the
14th of March 1852.
BRUNEL, SIR MARK ISAMBARD, was born on April 25, 1769, at Hackney, in the department of L'Eure, a few
miles from Rouen. His parents, who were respectable agri-
culturists, had found opportunities for himself and his eldest
brother by a show of a decision for mechanical pursuits; and on being sent to the seminary of St. Nicaise at Rouen, preferred the study of exact science, mathematics, mechanics, and navigation, to the classics; and during his course of study, in which he now and
then derived some satisfaction, but was more often than not happier than when busying 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 musical
instruments. All this constructiveness was little gratifying to his father, who would have preferred to see his son in the church or in the merchant's office.
On leaving the seminary at the age of fifteen, Brunel passed some time in the family of M. Carpenter, a friend of his father, at Rouen; and went through a regular course of instruction at the Pont-a-Mousson-bridge, with a view to the practice of his profession. He showed such 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 accurate map, guided only by the magnetic needle, and constructed a simple instrument of observation and a telescope; found, in its results unsatisfactory, he studied the instrument, and constructed another of ebony, which enabled him to take trustworthy observations.

He commenced perhaps by M. Carpenter, who had been a trading captain, Brunel enlisted as a sailor in 1796, from which date up to 1798 he made several voyages to the West Indies. He was remarked for the skill, intelligence, and good humour with which he discharged a seaman's duties; won the esteem of his comrades, and gained the respect of his masters by using by 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 1798, Brunel ventured to raise his voice in one of the political clubs against the ferocious doctrines there actively promulgated, and thereby endangered his personal liberty; but, obtaining permission from the minister of marine, he escaped to America, hoping to find employment for his abilities in a new country.

Brunel settled in New York. Here he joined a 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, Brunel and his friends, accomplished their object. Their success was due to the fertility of their resource and to the care they took to follow all the indications of nature. With this, 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 one in which, though not the first in the line of design, was distanced by none 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 forts 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 Carpenter, at Rouen, Brunel 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 made his mark in the Carpenters' Company, and the career of this country, 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 ingenuity 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 steam-power; seven of which cut and shape logs of elm or ash into the shells of blocks of any required size, while nine fashion stems of lignum-vitae into pulleys or sheaves, 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 1500 blocks are required in the rigging of a single ship of the line. It suits so satisfactorily produced a corresponding liberality on the part of government; and the inventor was rewarded beyond his expectation. The steam saw-mill in Chatham dockyard was erected by Brunel. The success of the circular saws there introduced led him to further improvements, by which the production of 1000 of these machines per year could be obtained. He invented a machine for making 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 cotton into hanks; for ruling paper; a contrivance for cutting and shuffling cards without the aid of fingers, produced in reply to a flattering request of Lady Spenser's; a hydraulic packing-press; new methods and combinations for suspending the engines of warships without centring. He was employed in the construction of the first Ramesgate steamer, and was the first to suggest the advantages of steam-tugs to the Admiralty. He constructed a carrying-cannon, acid gas as a motive power, and, assisted by his son, carried out experiments, 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 slight increase of pressure, the cost of the water, 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.

Brunel's works of engineering construction are to be found in different parts of the country; but in the county in which he is most popularly known is the Thames Tunnel. This great work, commenced in March, 1825, was successfully accomplished, notwithstanding the accidents, obstacles, and overwhelming disasters that heaped its progress. The water broke in more than once, and flooded the whole of the excavations. Brunel, 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 June, 1844, Brunel was made a Fellow of the Royal Society in 1814, and was chosen on the council, and appointed vice-president in 1833-33. He was a member also of other scientific societies and institutions. The honour of knighthood was conferred on him in 1850. With advancing years he became subject to a disease of which he had felt the first symptoms while completing the tunnel, and he died in December, 1849, having nearly reached the venerable age of eighty-one. His life is an example of what may be accomplished by genius, seconded by industry. The high character of his inventions, their essential usefulness, give them especial claims to consideration. In the words of a French writer, these have gained for him 'the celebrity that now distinguishes his name, the admiration of men of learning and of labour, and the affection of a nation.' Should he be enough to know him personally, could appreciate his simple and noble character.

(Traverses de l'Academie de Rouen; Proceedings of the Royal Society; Proceedings of the Institution of Civil Engineers; Quarterly Review.)

BRUSA. [Besa.]

BRYDGEs, SIR SAMUEL EGERTON, Bart., was born November 30, 1794, at Wootton Court, Kent. His father was Edward Brydges, Bart., one of the Knight of the Shire, and the daughter and co-heiress of the Rev. W. Egerton, LL.D., Prebendary of Canterbury, &c. Young Brydges was educated first at Maldon Grammar School, and afterwards at the King's School at Canterbury, and at King's College, Cambridge, entering at Queen's College in October, 1783. He left the University without taking a degree; entered himself of the Middle Temple in 1783, and in 1787 was called to the bar. He never practised, however; but having married in 1786, devoted himself to literature, and especially to genealogical 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 1786, his uncontrolled imagination, excited perhaps by his somewhat superficial 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 that his descent from the first Brydges or Bridges, who bore the title. Litigation was protracted till June 1803, when the House of Lords decided that the petitioner had not made out his right to the title. Henceforward every thing which Sir Egerton Brydges wrote, was more or less a war for the lost dignity, and after the death of his brother, he always wrote himself 'per legem Terrae Baron Chandos.' The worthlessness of his claim is amply shown in a Review of the Chandos Peerage Case, adjudicated in 1803, and of the pre- Tregear and later editions. Since the latter the barony per legem Terrae Baron Chandos of Sadeley. By George F. Belas., Esq., Lancaster Herald, '8vo, 1834. By impoverished 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 London and acquired a small property in the Priory, the seat of his son, where he amused himself by set-
ting up a private press, and superintending the printing of various pieces in prose and verse of his own writing, and reading books. After countless efforts to get into parliament, he was elected in 1811 for Maidstone, which place he represented till 1818. In 1814 he obtained a patent of baronetcy. On losing his seat in parliament he retired to the Continent, where he remained till the fall of Napoleon at Compiègne Gros Joan, near Geneva, September 6, 1817.

Besides the works above enumerated, and several pamphlets on population, wealth, &c., Sir Egerton Brydges wrote 'The Topographer,' 4 vols. 1798-1800 (in which he tried to answer the objections of Mrs. Mary de Clifford, '1799'); 'Fitz Albini,' a kind of fictitious autobiography ('1798); 'Le Forester' ('1802); 'Comoingsby' ('1819); and 'The Hall of Hellingsea' ('1821). 'The Censusaria Literaria, a bibliographical work of some value, in 3 vols. 1807-1809; 'The British Bibliographer,' written in conjunction with Joseph Harswood, 4 vols. 1810-12; 'Resitits, or Titles, Extracts, and Characters in Old Books revived,' 4 vols. 1814-16; a new edition of 'Collins's Peerage,' 9 vols. 1812; 'The Ruminator,' and 'The Wanderer,' two series of essays, 1813, 1814; 'Occasional Poems,' 1814; 'Bertrand, a Poem,' 1815; 'Excerpta Tudoriana, or extracts from Elizabethan Literature,' 2 vols. 1819; 'Res Literarum,' 3 vols. 1820-21; 'Letters from the Lord Chief Justice to the Rev. Dr. Borys,' 1822; 'Gnomica, or Detached Thoughts;' 'Odo, Count of Liungen, a Poem;' 'Theatrum Poetarum,' 1824; 'Recollections of Foreign Travel,' 1824; 'The Lake of Geneva,' 3 vols. 1828; 'Imaginary Biography,' 3 vols.; and 'The Author of the 'Waverley' Novels.'

BRYDON, [Chemistry, S. I.]

BRYZA, 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. These two classes of Polyzoa have been observed by Mr. J. V. Thompson previously to the publication of Ehrenberg's name, hence 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 Molluscan Zoophytes, on account of their structure being supposed to ally them to the Mol-lusca. For the same reason they have also been called Ascidioid Polyzoa (P. Ascidioidea). Milne-Edwards has also suggested Polytrocha, as the base of the fundamental order. Dr. Farre in a paper in the 'Philosophical Transactions,' 1837, proposes to call them Clyobrachia, in reference to the ciliated character of their tentacles. Mr. Busk in his Catalogue of the Zoophytes in the Collection of the British Museum, gives the component of the order Polyzoa as prior to that of any other. [POLYTOZA.]

BUCH, LEOPOLD VON, a distinguished geologist, was born on the 23th April, 1774, at Stolpe, in the Uckermark (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 Humboldt for a companion, and where Werner, its eminent founder, taught the then novel science of mineralogy, in a way so interesting and genial, as thoroughly to enerve the spirit of the old pupils. Under his teaching grew up a school of young philosophers, destined to wield and confirm his reputation, and amend his errors, among whom Von Buch was one of the most conspicuous. In 1792 the publication of his 'Mineralogical Description of the Carlsbad region,' formed the first of that series of valuable papers with which he enriched his favourite science for the rest of his life—all distinguished as much by conscientious inference, as by perfection of observation. Next appeared his 'Systematischer geologischer Beschreibung von Landeck,' describing a little-known part of the geology of Schlesien, with (for that time) a very advanced geological map of the country. These works are followed shortly afterwards by 'Versuch einer geognostischen Beschreibung von Schlesien,' with (for that time) a very advanced geological map of the country. These works and many others were read in the meetings of 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 February Von Buch and Humboldt met in Styria, and spent some time in geographical 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 finished a topographical description of the countries he traversed, in which, besides the clearness of perception, there began to appear doubts as to whether the Wernerian doctrine was tenable in its integrity. He grew more and more doubtful of the correctness of Humboldt's conclusions. A friend Von Moll, he says: 'Make the finest and surest observations, 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 February Von Buch arrived at Naples, and taking himself to the study of Vesuvius, described the phenomena in that picturesque and eloquent style which among other qualities characterized his writings. In 1802 he visited the volcanic region of Avignon. He revisited Italy, and was present at the eruption of Vesuvius in 1806. The results of these five years of observation were published in two volumes 'Geognostischen Beobachtungen auf Reisen durch Deutschland und Italien,' 1806-9, in which, among other subjects, he estimated the probability of the eruption of the Etna, 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 Lapp-land,' 1810: of which two volumes the second was published with notes by Professor Jameson in 1813.

The more interesting attach to these journeys as they were performed on foot. Few who met Von Buch walking with a hammer and a note-book, in summer a great coat with numerous pockets to contain maps, specimens, his hammer and note-book, would have believed that they beheld one whom Humboldt describes as 'the greatest geologist of our age; the first to recognize the intimate 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 encourage-ment of younger geologists, especially youthful students, less fortunate than himself.

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 in 1816 visited the southern coast of Africa. On his return from the Canaries, and in 1825 he published 'Physikalische Beschreibung der Canarischen Inseln,' with an atlas, of which the subsequent works, 'Über den Zusammenhang der basaltischen Inseln und Ueber Erhebungs-Krater,' and 'Über die Natur der vulkanischen Erscheinungen auf den Canarischen Inseln und ihre Verbindung mit andern Vulkannen der Erdoberfläche' may be regarded as supplementary. These volcanic researches alone would suffice to establish his reputation. The science of volcanology,—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 chains have been upheaved into the atmosphere, 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. His activity is also evident in his ideas in his paper 'Über das Fortschreiten der Bildungen in der Natur,' as to the 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, Cyphites, Torosporites, Ortho, Pro-
dacta, and others, accomplishing for the geologist what Cuvier had accomplished for the physi-
ological branch. In the words of the late Edward Forbes, it was Von Buch "who first developed the idea of the chronomor-
phology of genera, the greatest leading principle of natural history applied to geology." He is also noted for moving on to a new field of study, in which the important conclusions which he shows to be deducible from the nervation of the leaves of fossil
plants. And in his writings on climate, on hail, the temperature of springs, and the geography of plants—guiding princi-
ple of his life—he always—no, he proves himself an able physicist as well as geologist.

In his many journeys Von Buch visited Sweden and Nor-
way, and Avenger a second time, and any excuse sufficed to
draw him to Switzerland. He would leave his house in Berlin without telling any one of his intentions, 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 England. He was present at the Werner festival, celebrated
with so much pomp at Freiberg, in 1860. He never married,
was somewhat eccentric in his habits, but always serious
as regards science. When asked for his titles he was accus-
tion that the Royal Prussian Student of Mines branch of
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 world. His many failures in black cloth, for a ship
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, 1839.

"Von Buch was a genius," says E. Forbes, in his anniver-
sary address to the Geological Society. "He went about the
world casting the seeds of new researches and fresh ideas,
wherever his prophetic spirit perceived a soil adapted for
these plants. ... Yet he is the only geologist who has attained
an equal fame in the physical, descriptive, and natural
history departments of science. In all these he has been an
originalist and a discoverer. In every subdivision of
all three he has been a suggestion—a high merit in itself."

The "Abhandlungen" of the Berlin Academy of Sciences,
Leonhard's "Taschenbuch for Mineraloge," and other German
scientific periodicals, contain most of Von Buch's papers.
Among his other scientific records is the section on the "Umbold in America"—"Die Blumen insel, geographisch
beschrieben," 4to, 1847; "Ueber Carilibonu besonders von
denen die in Kreidebildungen sich finden," 8vo; besides
those above-mentioned. A French translation of his "Canary
Island excursion," published at Paris in 1836.


BUCHOLZITE, a mineral closely allied to Sillimanite.

According to Thompson it is composed of—

Silica 484
Alumina 529

A specimen from Chester, Pennsylvania, gave Erdmann—

Silica 401
Alumina 120
Paroxid of Manganese (a trace)

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

BUCKIDA, a genus of plants belonging to the natural order
Cembracae. One of the species, B. Buxara, yields a bark which
is used in tanning.

BUCK. [Dexa.]

BUCKINGHAM, JAMES SILEM, was born in 1756, in
the marine village of Flossing, near Falmouth, in Cornwall.
His father was a farmer, and died while Buckingham was yet a boy. His
father sent him to school at Falmouth, and was desirous of
bending him up to the church, but he preferred going to sea, and
made a few voyages to Lisbon, in the last of which his ship
was taken by the French, and he was made prisoner.

After some delay they were set at liberty, but his
way home were impresssed for the British navy. Buck-
ingham however escaped from 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, treated the
law, and abandoned that profession also. He married before
he was twenty years of age. About this time his mother
died, leaving him a considerable property in charge of true
trustees. He was entered business as a bookseller, on bor-
rrowed money. One of his trustees, however, finding his
business proved a failure, and he was left destitute with a
wife and female child.

Leaving his wife in the care of her friends, Buckingham
then went into the West-Indian trade, and was appointed com-
mandant as captain of some vessel; but having waited till his
bark was almost in a state of starvation, he obtained employment
in a printing-office, and was afterwards engaged at the Clarendon
press, Oxford. At length he was appointed captain of a
West-Indianman, and continued four or five years in the
trade. He afterwards was a captain in the Mediterranean
trade, and made many friends at Malta and Smyrna. He
then resolved to settle at Malta as a ship-owner and mer-
chant, and having purchased a cargo of goods, he 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,
he bought a ship and took goods in Alexandria, and he and 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 several of the leading Bactrians, of whom he was especial-
ly the pasha, Mohammed Ali, who was then absent on an expedition
in Arabia. At this time there was much speculation about
returning the commerce with India through the Red Sea, and
Buckingham was making a new voyage to the Mediterranean.
Buckingham had a despatch forwarded to the pasha, in which
he offered his services to examine the Isthmus of Suez for an
eligeable track, and to trace as far as possible the course of the
ancient canal. His offer, after some delay, was accepted,
and he was enabled to return to Cairo, and having arrived
at the cataracts, he started from Kneze on the Nile, with a
single attendant, for the purpose of travelling to Kosseris on
the Red Sea. His attendant deserted him on the route, he was robbed
of everything he possessed, and was left entirely naked.
He was befriended by a poor Arab, who supplied him with some
scanty covering, and at length reached Kosseris, whence he
was obliged to return to Kneze, and thence to Cairo,
without effecting anything. At Cairo he was introduced to
the pasha, who appointed him as his representative for inter-
ventions, and for the purpose of conducting the trade of the
ships for him in India, and to encourage a trade between
India and Egypt.

Mr. Buckingham then left Cairo for the purpose of
proceeding to Bombay by the Red Sea, and reached Suez, October
18, 1814, and Bombay April 6, 1815, having been delayed in
Arabia. 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
Imam of Muscat as commander of a vessel for the return to
England, which was intended to trade to China on the Imam's
account. When this was made known to the civil authorities
at Bombay, and also that he had no licence from the East
India Directors to trade in India, he received an order to
return to England, but, after much remonstrance on his part,
was allowed to return to Egypt in one of the East India
Company's ships, which was about to proceed up the Red Sea
for surveying purposes. He accordingly sailed from Bombay
June 27, 1815, was landed at Suez, and reached Cairo No-
ember 20, 1815. On his return to England he took many
parties to Alexandria, and was received with the utmost
honor, and at the time he was more or less understood
in all those countries.

From this period his proceedings in the East are imper-
fectly known. In 1816 he was in Calcutta, and established
a journal there, but the boldness of his censure of the mal-
administration of Indian affairs led to his expulsion from the
presidency of Bengal; his printing-presses were seized, and he was compelled to return to England.

Dr. Buckland, 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 reimburse him for the losses he had sustained by the suppression of his journal. He published an original work on "The Professor," which became the precursor of several similar journals, and "The Athenæum," which is now the leading literary journal among those which are published weekly. In 1822 he published his "Travels in the East and West Indies," in 1823 "On the Natural History of the Brontosaurus," in 1827 "Travels in Mesopotamia," in 1830 "Travels in Assyria and Media." At a later period he made several tours through various parts of Europe and of North America. He published 8 vols. on Belgium, the Rhine, and Switzerland: and 3 vols. on England, Scotland, and Ireland. He passed 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.

Dr. Buckland was a supporter of the liberal members of parliament for Sheffield, and he retained his seat till 1837. 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 subjects were generally of a high tone, and his manner was always 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 1849 he published "National Evils 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 elected a member of the Temperance Union in 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 vicissitudes and adventure on June 26, 1855. The court of directors of the East India Company had made amendments 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, with a moiety of his house, which had been his seat, and had also for a few years a pension of 200l. a year from the civil list. The manuscript journals of his various travels occupy, as he states in his "Autobiography," 28folio volumes, chiefly according to 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 science it was intended to illustrate, as exemplified in his "Descriptive Notes," with sections of 50 miles of the Irish coast, made conjointly with the Rev. W. C. Forster, in 1833, near Lindaff, during a tour in Ireland in 1813, and published in the third volume of the "Transactions of the Geological Society." In 1818 Dr. Buckland was elected a Fellow of the Royal Society. In 1830 he delivered a lecture before the university of Oxford on a title of the "Catechismus Geologicus," 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 accounts of the Creation and Deluge as recorded in the Mosaic writings.

In 1829 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," which was a cave containing a bear's den, the whole of which in the same year the society awarded him their highest honour, the Copley medal. This paper was made the foundation of a treatise published in 1835 "Reliquiae Diluvianae, or the remains of the Deluge," a work the title of which he gave to the "Action of a Universal Deluge," which proved of essential service in the promotion of geological science.

In 1825 Dr. Buckland was made canon of Christ Church, Oxford. He was president of the British Association at Oxford, and in 1826 he published 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 improving in this work the erroneous diluvial theory, Dr. Buckland brought the weight of his authority to support the views now generally received. One of the most able of his numerous geological writings, as subsequently testified by Murchison and Sedgwick, was a sketch of the "Transitional Species," 1820, "Annals of Palaeontology," 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 "Geological Observations," 1825, which formed a part of Dr. Buckland's skill as a field geologist, as well as a paleontologist, and among them, his description 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 was the only one of his title who has been president of the society. His early obituary addresses are printed in the society's "Journal." He was also a Fellow of the Linnean Society. In 1845 he was made Dean of Westminster; and, coming to reside in London, he was appointed a Trustee of the British Museum in 1847, and took an active part in the meetings of scientific societies, and in the establishment of the Museum of Practical Geology in Jermy-street. In the year 1850 he was obliged, in consequence of disease of the brain, to resign the Deanery, and he died at Chiswick on the 14th of August 1856.

BUFFALO, AMERICAN. [Bosu.] Bugeaud de la Piconnerie, Thomas Robert, Duc d'Isly, Marshal of France, was born at Limoges, 1784. He belonged to a good family, most of the members of which were among the emigrants of the first revolution. Young Bugeaud, however remained in France, and having chosen a military life, entered the army as a private in 1804. At Austerlitz he distinguished himself; the following year he was made sub-lieutenant. He served in the campaign of Prussia and Poland, and was wounded at Pultsk, Nov. 26, 1806. Sent into Spain as adjutant-major he speedily caught the eye of Marshal Suchet, who in his despatches makes frequent mention of Bugeaud's merits. He in consequence rose steadily in professional rank till he was made lieutenant-colonel, and appointed to the command of the 14th regiment of the line. On his return to France he was created a marquis.

The abdication of Napoleon I., Bugeaud gave in his adhesion to the restored dynasty; but, with most of the other officers, went over to the emperor on his return from Elba. During the Hundred Days he had the command of a small body of troops, and with it he succeeded in defeating a much superior Austrian force at the Flandre-ouest-Confins, June 1816. Upon the second restoration, Bugeaud retired to his estate, where he diligently cultivated the soil, till the revolution of July 1830 called him again into public life. He was elected a deputy of the Rhone, and became an earnest supporter of Louis Philippe, whose confidence he quickly gained, and who made him marshal. In January, 1834, occurred a deplorable event, which caused the death of the Marshal. The Marshal was married to a Countess Dupont, and she had a son by him: this son was very much beloved by the Marshal, and was living in Paris, near the Opera; this son, however, had been a great spendthrift, and Bugeaud was becoming extremely popular: this was the death of M. Dulong, in a duel between him and General Bugeaud, arising out of some
in Ohio in America, which is in part a true sandstone, and contains fossils. It also contains lime, and Mr. Dana sug-
gests that the knowledge of the lime by solution may have
given it its cellular character. It is a very hard rock, a
formation, and has an open cellular structure where carved for
millstones. The quartz rock of Washington in the United
States is in some parts cellular, and makes good millstones.


Bulgaria is noted for its copper and lead is found near the Carolina line, and in
in Arkansas near the cove of Wichita. (Dana, Manual of
Mineralogy)

BULGARIA, a country of Turkey in Europe, is bounded N. by the Danube, which separates it from the principal-
ity of Servia and the Balkan; S. by the Black Sea; and E. by
the cessions of Eminish and Khojsh Balkan; and W. by the prin-
cipality of Servia, from which it is partially divided by
the Danube. The country is about 224,000 square miles, and the population according to the estimate of
1844 was about 3,000,000, the majority of whom are adherents of the Greek Church. The area is thus distributed,
as nearly as we can ascertain:—Par-halic of Silistra,
including the territory of 13,000 square miles; pashalic of Nicopoli, 10,000 square miles; pashalic of
Widdin, 4,600 square miles; and a portion of the pashalic of Sophia, 4,600 square miles. These divisions however do not
 coincide with the present Turkish divisions of Bulgaria, which is divided into several smaller Sultanates, or
Duchies, or Provinces, as the Bulgarians call them. We retain, however, the old divisions in our maps.

The Danube runs with many windings, but in the general
form of a bow, with the convex side towards Bulgaria, all
the tributaries of the Danube flow to the north of the
river, and on the western side till they join the river, and thence it turns to the eastward and enters the Black Sea
by several mouths. (Bessarabia; Danube.) Reckoning all
its windings the river flows along the province for not
less than 500 miles, and is navigable for steamers and large
vessels all the way. Its course is serpentine in form, with
islands on both sides; its current is from north to south,
but on both sides of the river at intervals are extensive
marshes, which in the dry season are very unhealthy and
infested by moccinites.

The Balkan mountains are also called the ancient Haemus, and the
southern frontier to about 6000 feet, but the higher
heights sink rapidly on the south side; on the north the slope is more
gradual. The chain is traversed by many defiles and passes.

[Balkan.] From its crest numerous ramifications extend
northward to the plain of the Danube. These defiles are
in general well wooded or covered with rich pasture;
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,
flows through the valleys of the Strymon and Vardar, and
cross the pashalic of Widdin; the Wid, the Oma, the
Jantro (which passes the town of Tarnova), and the Lom,
which traverses the pashalic of Nikopoli, sometimes called
Shermenu and Samerene, and the south and north
Jemuru, and the Kara-Su, which drain that part of the
pashalic of Silistra which belongs to the basin of the Danube.
The Kamitch, which rises west of the Selimo Pass of
the Balkan, flows eastward through a longitudinal valley
between parallel ranges of the Balkan, and enters the Black
Sea between Cape Emenish and the port of Varna. In
the mountains that screen the valley of the Kamitch on the
north is the town and fortress of Shumila. The most
important of the other tributaries of the Black Sea in Silistra is the
Parawadi, which passes through the marshy lakes of
Devno and falls into the port of Varna. The Parawadi River is
identified by General Jochmus in his 'Notes of a Journey to the
Balkan' with the ancient Lygino; and the site of
Alexander's battle with the Triballi (a.c. 332) he considers
the isthmus between the two lakes of Devno, a little
west of the village Bayuk-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 locally identified by two large mounds called
Sandalk Tepé and Murud Tepé.

The coast of Bulgaria, or Silistra, from Cape Emenish, the
eastern extremity of the Balkan, to Cape Kalakria or Guigrid
is about 180 miles. The route goes through the
mountains of the Vardar, turns north, and runs north
west; the coast south of this last point the shore is for the
most part flat, low, and marshy. The most important places along this coast are the
city, port, and fortress of Varna, and the little town and
roadstead of Kustenjieh, which is only about 30 miles distant
from the point where the Danube makes the great bend
in northward. It has been lately proposed to cut a navigable

Bulgaria is noted for its copper and lead is found near the Carolina line, and in
in Arkansas near the cove of Wichita. (Dana, Manual of
Mineralogy)
neighbourhood of Kustenjë is inhabited by Bulgarians, and a good number of Russian colonists from Bessarabia, who have secured the situation of the peasants by a higher quality. In the rest of Silistria the country is well cultivated throughout, and yields an abundant supply of provisions of all kinds. Hard wheat of two kinds, distinguished by the name of "black," is grown in great abundance. Barley also of fine quality is extensively grown.

The other crops are maize, beans, and hemp, which in years of drought do not succeed so well. Several thousand oxen are slaughtered in the city of Silistria for the tallow, which is exported in the form of tallow works.

The eastern part of the pashalik of Nicopoli is well wooded as far as the neighbourhood of Rastchuk; it also possesses abundant pastureland, and, in ordinary years, when not visited by long drouths, it is very productive in corn. Woodcutting is the chief occupation of its inhabitants, and the peasants of this part of the country are all freemen. Between Rastchuk 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, salt, and corn, 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 Nicopoli, and throughout the greater part of the pashalik of Wallachia, the Danube is less navigable, and the farmers 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 is covered with pasturage as far as the eye can reach. The cultivation of corn for export 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 himself. Sometimes the pasha appropriated the surplus himself, ground it at his own mills, and then forwarded it for sale to 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 Varma, Sistova, Rastchuk, and other towns, for their hides and fat; for beef is seldom eaten by the Moslems, whose favourite animal food is mutton and goat. There is a depot at Varma for the tallow and other products of the province. Goods are conveyed there by the Danube. The navigation, and vexatiousness of the Russian quarantine regulations, the corn and other products of Bulgaria are generally brought by land carriage to Varma for export even from the plain of the Danube. Corn, however, for export to Constantinople is conveyed by the Danube, and the Russian custom-houses cut off the trade. Besides, corn is sometimes exported in the form of flour, to the extent of 100 tons, which is frequently shipped from the port of Matin, a small port opposite Brailoff, and then embarked in larger vessels. From the roadstead of Kustenjë also large quantities of corn are occasionally exported. The export condition of this part of the harvest 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 Cernavoda on the Danube. A canal was projected in 1837 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 mouth. This project has been recently revived, and will probably be 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; but, as a whole, it is a poor Jew, is an abomination. The manufactures of the country 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, Nicopoli, Sistova, Rastchuk, Silistria, Rassowa, Tarnovca, Sophia, Varna, Kustenjë, Shumen, Niza, &c., of which the most important are described under their respective names.

Bulgaria comprised the greatest part of ancient Mausia, which was occupied in the time of the Persian, and in the time of Alexander by the Triball. It is a very in-
wasting country for its historical associations, to illustrate which there is great need of enlightened exploration. Ge-
nerally speaking, the somewhat stationary situation of Slavonic countries has thrown a faint light upon the history of the expansion of Darius and Alexander in this country. He supposes Darius to have crossed the Balkan by the north-west of Mes-
embria, and to have marched northward to Isatacha by the way of the river Rupesh. He gives the following as the opposite direction in the campaign of 328. Alexander, he says, fought the action with the Thracians at the foot of the delib of the Balkan to the north of Aides; thence crossed the delib to the Lygion, near the town of Parawadi; and, after his victory, marched thence to the mountain in three days to the Danube, which he is supposed to have crossed at or near Siliistra, for the purpose of attacking the Geta. Bulgaria contains some Roman remains: the great system of fortifications in the flat of the Danubine, and the healing of Dyrachium on the Adriatic crossed the valley of the Timok, the ancient Timicac, above Widdin, and is still in parts entire. On the road from Shumia to Rostschuk numerous ancient mounds, covered with forest trees, are passed at a place called Lazaret, marking no doubt the site of some great ancient battle.

Moesia was originally inhabited by a Scythic or Slavonic people. It was subjected by M. Licius Crassus about A.D. 26, the Romans, who built entrenched camps along the Danube near Rupesh, and near the town of Philippopolis. The 3rd century it was invaded by the Goths, whose incursions were not thoroughly checked till the time of Aurelian, who planted several Roman colonies in the province. It was again invaded by the Goths in 375, after the defeat and death of Valens at the great battle of Adrianople in a.d. 378, ceded the country; and a part of those who settled in the western part of it are known in history as the Mosse-Goths. In the 6th century Slavonic tribes spread over Lower Moesia, and in the 7th century Upper Moesia was given by Heraclius to the Serbs and other Slavonic people, to protect the empire in that direction against the Avars.

The Mesnja, a Tartar people from the banks of the Volga, subdued the Slaves of Lower Moesia about the middle of the 7th century; but became in a short time so blended with the Slavonic part of the population, that before the commencement of the 9th century they had adopted the Slavonic language and customs, the name of the race which gave its designation to the country alone remaining. They were governed by kings who put themselves under the protection of the Greek emperors. This alliance however they renounced in 1165, their king Asan remarking that the Greek emperors were in constant quarrel with Hungary. At the end of the 12th century, the Turks occupied Albania, and the country was delineated between this and the 13th century, when Bulgaria was subdued by Stephen IV. about the time that the Turks made their first appearance in the Balkans. Under the Emperors of Nemanich, under the Sungem princess, and the people lost their independen-

cence. There are many Bulgarian colonies in Thrace and in the countries along the left bank of the Lower Danube.

During the Russian war of 1853-4 a portion of Bulgaria was seized and occupied by the Russian troops, and the fortress of Siliistra was besieged by them, but was not taken.

BURRIS, MISS. [D'Arrail, Madame, S. 1.]

BURNET, Miss. [Sangussofa; Potterm, S. 1.]

BURNETT, Miss. [D'Arrail, Madame, S. 1.]

BURNISLAND, Fifeshire, Scotland, a town, royal burgh, and sea-port, in the parish of Burnisland, on the north or left side of the Firth of Forth, is situated 22° 44' N. lat., 3° 13' W. long., about 54 miles nearly due north from Leith. The population of the royal burgh in 1851 was 2329, of the parliamentary burgh 2724. The burgh is governed by two bailies and ten councilors, of whom one is provost and unites with Kirkaldy, Dysart, and Kinghorn, in returning one member to the Imperial Parliament. Burnisland was made a royal burgh in 1588. At the Great Seal of Scotland which rested here in 1504 James VI. took the oath to the Coronation. The town was formed 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 church. The harbour is deep and very commodious. Being now the principal ferry station, the town has much increased of late years. There is a good dry dock; and on the eastern pier is a lighthouse, the light of which may be seen a distance of seven miles. Burnisland formerly possessed a considerable trade. About 1862 there were twelve ports, including St. Andrews and the now extensive
port of Kirkaldy, which were subordinate to Berwick.

For many years past its traffic has been confined to that arising from the carking 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 Frith being effected here by a floating railway.

The parish church was built in 1592. There are also a Free church, and chapels for Episcopalians and United Presbyterians.

North from the town, on the summit of Dunesarn Hill, an eminence rising 695 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 15th century.

Bute, one of the islands which compose the county of Bute, Scotland, is situated in the Frith of Clyde, between 56° 46' and 56° 06' N. lat., 4° 66' and 5° 10' W. long., distant about six miles from the opposite mainland of Ayrshire, and about half a mile from Arryleshire, from which county it is separated by a narrow and crooked but picturesque channel called the Kyles of Bute. The population of the island in 1851 was 10,661. 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 barren; the central part is diversified by hilles, valleys, and fertile tracts; and the south end is hilly and divided from the rest of the island by a low and sandy plain called Langal-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 Ascog, and Loch Quein. The climate though damp, is mild and temperate, and the island is much resorted to by invalids, Kethsay being one of the favourite watering-places of the Clyde. The minerals are limestone, freestone, slate, and some indifferent coal. Beds of coal and shales, of considerable thickness, are found in several places half a mile from the sea-coast.

Bute island contains many remains of antiquity. Dun-ghle, or Dungallag, a vitrified fort, attributed to the Danes or Norwegians, and situated on a lofty crag in the southwest 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. Harco of Norway in 1883 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 Argyre's unfortunate landing in 1685.

(The New Statistical Account of Scotland.)

BUTE, a genus of birds belonging to the order Raptora and the family Falconidae. It includes, according to Yarrell, two British species, B. vulgaris, the Common Buzzard, and B. lapogus, the Rough-Legged Buzzard. [FALCONIDA.] Various other species of the Falconidae have been included under this generic name. [Yarrell, British Birds.]

BUTYRONE. [Chemistry, 52.]

BUTYRYLE. [Chemistry, 52.]

BYRONIMA, a genus of plants belonging to the natural order Malpighiaceae. The bark of the species is astringent, and is used extensively for tanning in the Brunia. The wood of some of the species, especially B. variaefolia, is of a bright red. The bark of B. eurysilis is used in fevers. B. casiasi is one of the thousand remedies for rattle snake bites. It is called Chapera Maneta. The Alconeroe Bark is the produce of B. laurosifolia, B. rhopalosifolia, and B. co- colocosifolia. The acid and astringent berries of B. eurysilis 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° 20' N. lat., 75° 45' W. long.; distant 186 miles N.N.E. from Kingston, and 284 miles N.E. by E. from Toronto; the population of the town in 1851 was 7780. The lower town, which is the older part, is in which bu-iness 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 crownlands 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 341,700L. About three-fifths of the whole being cut on crown-lands was liable to duty, amounting to about 24,000L. 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.
CACELOT. [WHALE.]

CACODYL. [CHEMISTRY, S. 1.]

CADDICE, CADDIS-WORM, or CAD-BAITE, the common name for the larvae of the species of Phryganea, which reside in the water, in cases which they form of various sub-
stances, such as bits of stick, grains of sand, and all stones, shells, &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 drawing in its head or putting it out, according to the cir-
cumstances.

CADET, LIQUOR OF. [CACODYL, in CHEMISTRY, S. 1.]

CAHIR. [TIPPETT.]

CASTOR. [LINCHESTERI.] -

CALAMOPHILUS, a genus of Birds belonging to the family Parisidae and the tribe Incessores, sub-tribe Dendroctres. C. biannricus of Yarrell is the Porus biannricus of Pensaent and other writers. This bird is common in Great Britain, and is known by the name of the Bearded Tit. [TITCHEN. (Yarrell, British Birds.)

CALEDONIAN CANAL, a connected series of lakes and canals extending through Glenmore, or the Great Glen of Atholl, and connecting the Western Ocean with the North Sea. It runs through foreshore and customs estates occupied the celebrated James Watt to report on the practicability of a canal from sea to sea through Glenmore. Watt's report was not favourable; but the foreshore estates having been soon after restored to the families to which they had formerly belonged, the office of trustee was abolished, and the project dropped. In 1802 the scheme was revived, and government employed Mr. Thomas Telford, the civil engineer, to re-
survey the district, and to report on the result of his investiga-
tions. This report was in favor of the construction of the canal, and the work was instantly proceeded with under Mr. Telford's direction. Operations were commenced in 1803.

In 1803 the eastern division of the canal was opened for navigation, and in 1822 the whole canal was opened for navigation. The toll on the passage was opened accordingly.

The Caledonian Canal commences on the south-west on the shore of Loch Eil at Carphag near Fort William, in 56° 56' N. lat., 5° 12' W. long., and joins Loch Lochy by a cutting 8 miles in length; a short cutting of about 3 miles between the Loch Louchy and Loch Oich; a canal nearly 6 miles long continues the navigation from Loch Oich to Loch Ness on the north-west end of Loch Ness a canal of about 7 miles in length also continues the passage to Crichton near Inverness; whereas another short artificial cutting, it opens into Monadh Frith on the shore of Loch Beauly, in 57° 56' N. lat., 4° 15' W. long. The length of this communi-
cation between the west and east seas is in all about 60 miles, of which rather more than 37 miles are through natural sea, and his life was devoted to improving them by the aid of cutting. The summit level is at Loch Oich, which is about 34 feet above high water on the east coast at spring tides. There are 28 locks in the range, 14 being to the west of Loch Oich, and 14 to the east. The locks are about 170 feet in length and 40 feet in width, the rise at 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 consider-able engineering difficulties to be overcome in the construction of the canal. The object propounded for this national work was the avoidance of the tedious and often dangerous voyage by the Orkneys and Cape Wrath. From Kirkwall'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 not more than 250 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; once chief work was indeed cut off by the act of the legis-
lature imposing taxes upon the import of timber from the Baltic, in order to encourage the employment in this country of timber of Canadian growth. For a number of yeas the public work was detained in the locks by calm and contrary winds: since 1847 this has been remedied by the establishment of steam-
vessels using this line of navigation. The amount of public money granted by Parliament at various periods from 1803 to 1857 was 1,542,387l. 6s.; the amount received for canal dues, shire dues, &c., to 30th April 1857, was 95,045l.; for towages, 5152l. 6s. 4d.; for rent of houses, stables, lands, 
mills, &c., 11,318l. 16s. 3d.; for interest of cheque bills, interest from bank, &c., 11,767l. 16s. 7d. The cost of construction, repairs, management, law expenses, shipping, roads, &c., from 30th October, 1803, to 30th April, 1857, was 11,655l. 6s. 8d., and the mileage through of steam-tug vessels, 25,452l. The canal rates are in most cases one farthing per mile per ton for the whole passage, the rate for towage being similar. The charge on steam-vessels passing wholly through the canal is 2s. per register ton, whether laden or unladen. In 1848 the commissioners, with the view of inducing a greater number of the Baltic traders to use the passage by the canal, reduced the dues on trading sailing vessels exceeding 120 tons register to 1s. per register ton for the through passage; and to encourage the traffic connected with the fisheries, the towage rates on vessels laden with herrings or salt were reduced by one half. The opening of the Caledonian Canal has given rise to an increased inter-course and traffic between Inverness and Glasgow, and generally between the eastern and western districts of Scotland. Much damage was sustained by the works of the canal in December 1848 and January 1849 by a severe storm and heavy rains. The damage was repaired with great skill and promptitude, and at least cost than was antic-
pated, under the direction of Mr. Walker, consulting engi-
neer to the commissioners, and Mr. George May, their resident engineer. To cover the expense, Parliament granted 10,000l.

to the commissioners in 1849.

(NEW STATEMENT CONCERNING SCOTLAND; FIFTY-SECOND REPORT OF THE COMMISSIONERS FOR MAKING AND MAINTAINING THE CALEDONIAN CANAL; LIFE OF TELFORD, EDITED BY RICKMAN.)

CALENDULA. [ALAUDINE, S. 2.]

CAILOUGH, JOHN CAILLOUGH, one of the most in-
fuential of the recent statesmen of America, was born on
the 18th of March, 1782, at Abbeville, in South Carolina. His father, Patrick Calhoun, was by birth an Irishman, but he emigrated to America early in life, settled in Carolina, and took an active part on the American side during the war of independ-ence. John C. Calhoun graduated with distinction at Yale College in 1804; and, having completed his legal studies in Connecticut, returned to his native place in 1807, to enter upon the practice of his profession. He was elected the following year a member of the South Carolina House of Representatives, where his clear vigorous intellect soon ob-
tained for him considerable notice. In 1811 he was sent as representative to the United States Congress, and the rest of his career in Washington is marked by the discussion of the important measures which in the course of the next five years excited the public mind, Mr. Calhoun played a prominent part, and his fervid eloquence, eagerly defending and stimulating the popular war-cry, won for him a com-
manding position. On Mr. Monroe's election to the presi-
dency of the United States in 1817, he appointed Mr.

Calhoun his secretary of war, a post he retained during the eight years of Mr. Monroe's tenure of office. His admini-
strative services were marked by energy and judgment, and secured his position as one of the ablest public men of his time. On the next election, 1828, he was nominated as a candidate for the presidency, but withdrew his claim, and eventually was chosen vice-president. To this high office he was re-elected in 1829, when General Jackson occupied the office of president; but he differed greatly from Jackson in policy, especially on the Tariff and Bank Charter questions; and in 1831 he resigned the vice-presidency, and was elected by the South Carolina legislature to the Senate. From the end of his term of six years he remained in retirement until President Tyler, in 1843, appointed him secretary of state, an office he held till the election of President Polk in 1845. In that year he again became the representative of South Carolina in Congress. He was regarded as the great leader and representative of the southern states in Congress, and no man was listened to with greater attention by all parties. An intense and fervid
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united, 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 was called, the Whig side, and, like Calhoun, had the misfortune to die before his time and before he could bear the fruits of his labors. 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.

Calhoun was the father of birds belonging to the order Anseriformes and the family Anatidae. It has the following characteristics: Beak as long as the head, straight, slender, flexible, compressed at the base, with the point dilated and smooth. Bill bent in a curve, narrow, pointed, distinctly cleft in the basal furrow, which extends to the smooth point of the beak; wings of moderate length, pointed, the first quill-feather the longest; legs of mean length, naked above the tarsal joint; feet with three toes, all directed forwards, with a very small connecting membrane at their base. GLand, 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 G. aranaria, the Sanderling. 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 Mollusca, shrimps, annelids, &c. It visits the shores of Sweden, and is stated to breed still farther north. It is said to be found in the east of Ireland, and off Hoy's Bay. It does not appear to breed in the British Islands. (Yarrell, Brit. Birds.)

CALIFORNIA, STATE OF, one of the United States of North America, is bounded N. by the United States territory of Oregon, E. by the United States of New Mexico, and S. by the Mexican territory of Lower California. Its western boundary is the Pacific Ocean, along which it extends from 32° to 42° N. lat., its eastern boundary is defined by a line which runs from 120° W. long. from 42° to 39° N. lat., thence in a south-eastern direction till it intersects the Rio Colorado at 35° N. lat., whence it is continued down the middle of that river to its mouth in the Gulf of California, 32° N. lat. The area is 160,000 square miles, and the population, estimated by the census of 1850, 607,067. 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 since has been admitted into the Union as a sovereign state. The extraordinary increase of its population will be seen by the following statement:—In 1852, Humboldt river, which is supplied by the south side of the Sierra Nevada, and the missions, estimated the entire population of Upper California, which included, besides the present State of California, the territory of Utah and (in part) that of New Mexico, at 16,062, of whom 15,062 were 'converted Indians.' The official statement of the father of the United States of California in 1829 was 20,105, of whom 18,763 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 thecession of California to the United States was in 1850, when the State of California had a total population of 117,538. In 1852 a census was taken by the State authorities, when the agents' returns gave the population as 294,435; but the Secretary of State, Mr. Bache, official Report, 1852, states that the census 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 308,607 as the population in 1858; of whom 210,858 were whites, little more than 30,000 being females, and 108,344 being citizens over 21 years of age; 260,000 were negroes, of whom the females were under 300; 875,043 were American Indians, and 75,043 were 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 Joaquin; on the eastern side wide sandy plains, and on the western the narrow slip of coast. The coast of California is generally rugged and precipitous. Beginning at its southern extremity, it makes a bold semi-circular sweep to the north-west as far as Point Orme, thence by a series of projections and indentations, 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 size. Beyond Point Orme, from north-west to Point Pinos, 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 direction almost the unrivalled 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 50 miles both on the right and left; its entire length is about 100 miles, with an average breadth of 8 miles, and it has a coast of 375 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, except at Suisun Bay, where the current of the Sacramento runs from Yerba Buena Island to the north. This bay is the natural outlet of the valleys of Sacramento and Joaquin, with their wondrous mineral riches and vast agricultural capabilities. Beyond San Francisco Bay is Port Bodega, where was formerly a Russian station. Coos Bay, on the north-west coast of Oregon, is a good passage, but less broken than before, to Point Delgado, beyond which is the broad headland of Cape Mendocino, 40° 31' N. lat., which forms the southern point of the Bay of Trinidad, in which the coast of California terminates. The mountain ranges which constitute the peninsula of Lower California extend undivided into the State of California far north as the snow-capped peak of St. Bernardino, 34° 11' N. lat., where they divide into the two great ranges already mentioned, and run parallel to each other generally parallel direction. The eastern range, called the Sierra Nevada, or Snowy Range, is by far the loftiest, most of its peaks being above the line of perpetual snow; the Saddle Peak is 7300 feet high, the Table Mountain 8000 ft, the Butte 8600, Mount Joseph 10,000, and Mount Shasta at the northern extremity of the range (41° 34' N. lat.) 14,590 feet above the sea. This range is traversed by few and those very elevated passes. North of 39° N. lat. the range of mountains begins to subside, the peaks become lower, the range less in elevation, and the country more level and flat. The coast range has a median mountain, the Mission, on which the head of San Francisco Bay, is 3700 feet above the sea. This range is broken near Monte Diavolo by the united Sacramento and Joaquin 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 northwards to the State of Oregon. To the south of the United States the highest 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 divide throughout California, forming numerous narrow valleys and ranges.

The basin included between the two main ranges, though really one geographical formation, bears the names of the Sacramento and Joaquin valleys, from the rivers which rise in these ranges and flow down the centre of the valley. The basin is divided into two parts, a tract near the centre of the valley, and flow into San Francisco Bay. This fine valley is upwards of 500 miles long and 50 miles wide. It has evidently at some remote period been a bed of large lakes, of which the Sierra Nevada and the Coast Range formed the margin. The waters of this ancient lake have been drained by some perversion of nature having broken a passage through the Coast Range at San Francisco Bay. At the southern extremity of the valley are the Tailare (Sierra) Lakes, which during the wet season extend above 100 miles.
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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 lakes and draining the rich tract of country hitherto subject 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 productive. The surface of the valley is greatly diversified, 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 intersected by valleys of sloping outline used for agriculture into 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 embraces 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 no means the most populated part of the country—is full of narrow fertile 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 also, the sea has worn away many of the low hills, which in some places reach many miles inland. The country east of the Sierra Nevada, and west of the Rio Colorado, comprising the remaining portion of California, is mostly level, and but little known, owing 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 white much of it is of comparatively small account, there are very extensive tracts, of arable land, into unappropriated 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 two 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 St. Hilaire and some of its spurs. Its course throughout is generally south, and it receives on its left bank a great number of affluent stream from the Sierra Nevada. Most of these are mere mountain torrents; but several of them, as the Feather, the American, Cosumnes, and the San Juan, are large streams of the same alive from melting snow, and the Sacramento receives the San Joaquin, and the inverse turns abruptly to the west, and soon after expanding to a considerable width drops into San Francisco Bay. The entire length of the river is about 800 miles, and it is navigable for many miles above its junction with the Joaquin, varying from 200 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-west, and like the Sacramento it receives numerous tributaries from the Sierra Nevada. During the wet season the San Joaquin is great floods, and the course of the river is marked by small or large islands. Its course is navigable for vessels drawing 8 feet of water up to Stockton, 3 miles above its junction with the Sacramento, and for vessels under 15 tons up to the Tuolumne River. The San Joaquin abounds in fine fish, and the taking and drying 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 more and more desirable to settlers, especially along that portion which drains 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 country not very fertile, is not of great depth, often not more than 6 feet of water for some distance above its mouth: that part of California which lies in its basin is almost unknown. Along the coast are numerous rivers which rise in the Coast Range and after a short course fall into the Pacific. Among these are the San Buenaventura, San Felipe, San Pedro, and the Smith; many of them are of considerable value for irrigation, and may at some future period be rendered available for mechanical purposes, but none are navigable.

Numerous roads have been formed in the state since its cession by Mexico in addition to those previously existing, and many bridges have been built and ferries established across the principal rivers; but the communications of the state are of little importance and the state of the roads in contemplation the most important is the great line from the Mississippi to the Pacific Ocean. The only line completed in California is that of the Sacramento Valley, 52 miles, the receipts of which in 1856 were 1,354,030 dollars. [Geology.] The Sierra Nevada, with its connected ranges, has for its substratum schistose or talcose slate; quartizes rocks are the prevalent strata covering the slate. In many places a fine white quartziferous granite occurs. In the Coast Range quartz also as well as Sulfur stone is found throughout the lower ranges of hills. Bituminous coal is worked in the neighbourhood of San Francisco Bay; it has also been found about San Diego Bay, and is believed to occur in various localities.

Sir Francis Drake, who visited California, which he named New Albion, in 1678, received such reports of the existence of gold from the natives that he declared it to be his conviction that there was no part of this country wherein there is not some special likelihood of gold. Yet though his story was afterwards often repeated, and the more curious collections of travels, and occasionally in geographical works, no search seems to have been made for the precious metal. The remarkable discovery of the auriferous wealth of California by Mr. Marshall, in the Columbia River, in 1847, by a Mr. Marshall, who was engaged in erecting some saw-mills on the estate of Captain Suter, a wealthy American settler on the Sacramento River. The effect of the publication of this discovery was most extraordinary. The gold in the river's bed, which was rich, attracted multitudes of adventurers to its banks, and the Rightful ownership into the country was quite without parallel in the history of the world. California was at this time occupied by American citizens, and its formal cession soon after to the United States has put into the possession of a people as distinguished for capacity of self-government as any other, not, indeed, as it had hitherto been, of a singularly indolent and incapable race; thereby affording as it were opportunity for the full development of its marvellous capabilities, and at the same time proving against the growth of any nation which might else have ensued. As it was, towns and cities as they were termed, though the houses were commonly only of wood or canvas, sprang up with a rapidity hitherto unknown; the magnificent San Francisco City was for the first time formed of a large number of buildings. The possession of a country of such vast extent with anxious adventurers from almost every part of the world. All ordinary labour was neglected in the rage for gold seeking, which seized indiscriminately on all classes, and the laborer, in a great degree, was obliterating at low prices. The quantity of gold discovered continued for a while to increase even beyond the proportion of searchers for it. By the end of the year 1851 it was estimated that gold to the amount of nearly 150 millions of dollars had been found. No correct estimate is possible, as no official account has been taken of the gold obtained, but from what appears to be an exaggerated estimate the quantity found in 1849 was valued at 40 millions of dollars, and it is believed that the average yearly find has been since then amounting to between 50 and 100 millions of dollars. The quantity of gold-dust and coin manifested and shipped on board steamers and sailing-vessels from San Francisco during 1853 was 46,256,574 dollars; but this does not show the entire amount exported, as large quantities are taken aboard in ships without being entered on the manifests. If 10 millions be added for this the total quantity shipped in 1852 from San Francisco would be about 65 millions of dollars. The quantity received at the mint of the United States during the year 1854 amounted to 183,973,057 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 522,305,688 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 average from 4,000 to 8,000 feet in height, and the gold is generally found in gulches and ravines, 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. This gold has been found in situ; it has been in connection with quartz; and the water-worn gold found in the debris of the rocks and the sands of the rivers in like manner shows, by its frequently being carried to a great distance, that it was derived from a quartzose bed. The main gold region, as we have said, is the lower mountains on the west-rn side of the Sierras, Nevada, but gold has been also found in the lofiiter central heights of the Sierra Nevada, and on its eastern side, near the coast. Coal is also 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 no 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 western mountains in a lens, in a mixture of copper, of which it is produced near 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. Copper is also present in the thermal springs. These metals are also believed to abound. Coal is profitably worked at San Francisco, and is supposed to exist in extensive beds in other parts.

Biology 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 (Piinus douglasi), which occurs on the mountains about San Francisco Bay, and grows freely between 1,200 and 2,400 feet, and of a circumference at the base of the trunk of 60 feet. The cones are eaten by the Indians. The P. subalpina, P. Lambertina, and P. nobilis are of less magnitude but still very large dimensions, and great beauty. The live oak (Quercus virgata) grows to a considerable size on the lower hills of the west side of the Nevada, and on it Fremont found unusually large quantities of mistletoe. The white oak is common in the valleys. The maple, ash, beech, and chestnut are the other more usual deciduous forest trees. The firs are more numerous than any other tree, and generally extend south of 39° N. lat. Two or three kinds of Arbutus abound on the banks of the rivers and the margins of the forests. The Scilla quiejina grows everywhere along the coast; its root is the quiquam of the Indians, with whom it is considered a delicacy. The Fibres of the hemp (Cannabis) and the Helonias tanax are made by the natives into a very tough cord for horseicking, &c.; and the amole and samate are used by them for rope. Large numbers of Polemoniae, especially some beautiful specimens of the Leptosiphon and Gilia; some curious plants belonging to the genera Nema- phila and Esmemanns; several new genera of poppies, Bachechloca, lupins, Calochortus, Cymbobatrach, Callitropsis, Bredex, &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 racoon, American badger, glutton, ermine, wassel, mink, mart, and skunk are common in many parts; as are also the tiger, or musk-vat, about the mouth of the Sacramento; all of these are much sought after for their skins. Several kinds of wolves, foxes, and lynxes abound on the interior forests of the north, where they prey on the numerous deer and other animals which frequent those regions. Of the deer, the moose, the black bear, and the long-tailed or jumping deer, the elk, and the prong-horned antelope (A. fuscus) are the most plentiful. Mountain sheep abound. The bison is only occasionally met with. Among birds the first place is due to the great California vulture, also the Sturmgraup. California has no birds of the way the latter is found only to the South American condor, in size, and very similar to it in its hirns. The black vulture, the turkey buzzard, the golden eagle, the bad eagle, the p-reigning falcon, the jay, the loag, and several others animals and 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 found. The humming-bird is common in the south. The grasshopper, or locust, is also very common of this kind; than have been found in any other country. The bays and inlets of the coast are swarm with swans, geese, ducks, curlews, and most of the other ordinary wading and swimming birds. Large numbers of white pelicans frequent the coast. They 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 100 pounds, which are sometimes shot, measuring 10 or 12 feet long, and weighing nearly 500 pounds. Macerel, pilchards, and sardines are also common in the coast waters. The clams are also abundant. Oysters of excellent flavour and most other shell-fish are found. But though fish is so abundant, the fisheries are at present little heeded.

Climate. - 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 considerable variations, both in the temperature and in the amount of rain, in different parts of the state. In a certain part, north of 39° N. lat., for instance, the air during the dry season is much less parched and rainy than is elsewhere. It is much hotter and drier along the coast than in the interior, especially towards the north, where the climate is more temperate than in the south. The climate is in general one of great diversity and variety, being at times excessively hot and parching. In 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 till late at night. In winter, when the cold is modified, and the temperature becomes equal and agreeable. Throughout the great valley of the Sacramento and San Joaquin, the mid-day heat is so great as to render labour in the open air everywhere unpleasant, and in many parts positively dangerous. 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 now justly exists by irrigation to render it capable of producing almost every variety of crop. The banks of the rivers 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 excepting those of the tropical regions, grow very well in the United States, flourish in the sheltered valleys connected 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 raised in abundance. These fruits are generally very sweet and nutritious, affording excellent pasturage for cattle. North of 39° N. lat. are extensive forests of pine and oak. The valleys along the coast produce all the cereals, and all or nearly all the vegetables of the temperate and colder parts of Europe. Peaches and a few melons are raised on some few hills; the produce from nine counties in 1852 was returned at 5,533,656 pounds. Tomatoes are extensively cultivated in parts of the great valley; 1,039,600 bushels were raised in 1852 in Sacramento county alone, and in the same county 250 acres were planted with melons. In the county of Santa Barbara, on the southern part of the coast, 1370 barrels of olives were gathered; and in this and the adjoining county of Los Angeles 73,462 gallons of wine, and 73,036 gallons of brandy were made. Agriculture has however hitherto been comparatively neglected, but as more attention is being paid to it the various capabilities of the soil are becoming more apparent, and there can be little doubt that California is destined to take a high rank as an agricultural country.

It is usual in taking the census of the various states of North America to ascertain the quantity and value of the various productions. In the state census of California for 1852 these returns are very incomplete, but they were sufficiently accurate to show that the Union obtained a very favorable view of the position of California in reference to other states of the Union, which is at once so curious and interesting that it may be worth while to quote a few of the results of this census. In barley California surpasses every other state in the Union except New York, and already raises half as much as is produced in the whole Union besides: in oats it
cultivates more than three fourths of its sister-states; in
wheat it surpasses ten of the states; of maize it produces
less than any state, and it ranks twelfth in small grain,
and grows one-fifth of the quantity produced by the rest of
the Union; in beans it surpasses nine of the states; in hay,
though only half of the counties made returns, it surpasses
nine states; and in fruit it exceeds all the states in variety,
and one-half in quantity. In the number of horses it exceeds
15 of the states; of mules 26; of milk cows 12; of work-
oxen 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 in beef cattle, 14 in horses, 11 in mares and 28 in
sheep and swine.

The trade of California is chiefly carried on through 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 1852:

Entered.—Sailing vessels 87 of 326,138 tons. Steamers. 127 118,876

Total 1003 445,014

Of these, 40 vessels of 16,856 tons burden were British, and
554 vessels of 317,292 tons, vessels from foreign countries.

Cleared.—Sailing vessels 1331 of 356,092 tons. Steamers. 158 127,047

Total 1489 483,139

Of these, 1121 vessels of 361,168 tons burden were America-
ian. In 1849 the tonnage of the vessels entered at San Francisco amounted to 313,351 tons, of which 247,417 tons belonged to the United States. The number of passengers may be taken for an average of 15,000, and the number of Rep.-3entatives of 36 members, el-ch-t for one year; the
sessions of the General Assembly are held annually. The
magistrate is elected for two years; his salary 6,000 dollars
per annum. The revenue for the year ending June 30, 1856,
was 733,350 dollars; the expenditure for the same period was $1,368,514. The total debt of the State, Jan. 1, 1857, was $4,138,977.
The judicial power is vested in a supreme court and district
and county courts. The supreme court consists of five jurists,
or chief justices, who have an annual salary of 8,000 dollars, and two
associate justices, each of whom has a salary of 6,000 dollars a
year. The magistrates are elected by the people for six years,
and no one is elected that goes out of office every two years.

The first judges of the district courts were chosen by the legis-
latue, but all future judges are 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
children shall be instructed during the day free of charge.

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 colonized in 1768 by the Sparsida, who established various places, chiefly west of the Coast Range, as military posts (presidios) and religious
stations (misions). There were four of these military
and twenty-one missions; and while California re-
mained subject to Spain the actual direction of the country
was in the hands of the priests, the governor having very
little influence over them. In 1821 the country became
independent, governed by Mexican priests and native Indians
in villages, and taught them to cultivate the soil, and gave
them little instruction either religious or secular.
According to the latest account published by the priests there
were above 18,000 in these post 'converted Indians,' who spoke twenty different languages. On the separation of Mexico from Spain the missions were broken up, and the Indians returned pretty g-nearly to their native state. After the declaration of Mexican independence a good many
Americans and Californians emigrated to California,
with the purpose of hunting or traffic, and several Americans
met in the neighborhood of San Francisco Bay. The governors
appointed by Mexico were unable to maintain tranquillity in the province, and a new insurrection broke out in 1850.
A successful revolt, mainly excited it is said by the foreign
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, the United States, California, and Mexican governors, 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. The war between Mexico and 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.-Von, *Statistical Gazetteer of the United States, 1853; American Almanac: Fremont, Wilkes, and various Travels, Journals, &c., in California; Visits to Gold Digging, &c.)

CALIFORNIA. A genus of plants belonging to the natural order Polypodaceae, of which one species, *C. Pallidula*, yIELDS in its roots an amylaceous gummy matter, on which the Calamabcd in feeds in times of scarcity. The fruits and branches are acid, and are chewed by the same people to alleviate their thirst. This plant is desis sent of lemons, and grows in great abundance on the sandy steppes of Siberia.

CAMBERWELL. [Surrey.]

CAMBRIDGCE. [Cornwall.]

CAMBRIDGE, one of the principal cities of England, a river of Africa, which discharges itself into the Bight of Biafra and into the same estuary as the M-layer, about 45 miles E. from Fernando Po. It has a bar across its mouth, with an average depth of from 15 to 20 fathoms a mile or two over it. Of this river little is known beyond a few miles above the estuary; but on this coast, it has been long known to be a great mart for slaves. Palm oil and ivory are obtained here; the latter is considered very fine. The system of traffic is by barter. This river is separated from those to the westward by high land called the Cam-roon Mountains, the highest peak 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 there is a great abundance. Each side of the river claims the rights of friendship; but property must be purchased by presents before any traffic is commenced.

CAMPDEN, CHIPPING. [Gloucestershire.]

CAMPBE, a genus of plants belonging to the natural order Lecanoreae, or Lecanoraceae. This genus was constituted by Nees von Esenbeck for the *Lecanora Campaniformis* of Kämpfer, the plant which yi-las the Camphor of commerce. It is known by its hermaphrodite panicled naked flowers; 6-chit papery calyx; 6-leafed, oblong, obtuse, the inner row with two stalked glands at their base; the anther 4-celled, the outer turned inwards, the inner outwards; the fruit placed on the oblongical base of the calyx; the leaves tripinnate, glandular in the axils of the principal stems; the leaflets decurrent along the midrib. C. officinarum, the Camphor Laurel, is a tree with lax smooth branches; the leaves are bright green and shiny above, paler beneath, and somewhat coriaceous, with a sunken gland at the axis of the principal vein, projecting at the upper side, opening by an ovate pore beneath. 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 yielded 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. [Caphhorse.]

CAMPION. [Lycens, s l; Silene.]

CAMPBELL. [Strathclyde.]

CANN. [Leith, East.]

CANNON. [St. Louis.]

CANNON. [Montreal, and Quebec. [Montreal, Quebeck.

Quercus.* The other towns are Rivers, Sr. Hyscinthe, Sherbrooke, and Sorel. Three Rivers is prettily situated at the junction of the St. Francis and the Richelieu rivers, and has a population of 4036. There are iron mines near the town. There is a considerable trade in pot- and pearl ashes. Three Rivers is one of the depots of the northern line of steamers, and it is the chief port of some important investment in a commercial point of view. St. Hyacinthe, population 3313, in St. Hyacinthe county, is situated on the left bank of the Yamaska River, about 30 miles E. by N. from Montreal. It is the seat of a college. Sherbrooke, population 11,000, is the chief town of the district, and its principal business is situated at the junction of the Magog with the St. Francis River. Its extensive command of water-power gives it great facilities for manufactures. The chief public building here is the court-house and jail. Sorel, or William Henry, population 10,000, is situated on the Richelieu River, on the old road to St. Lawrence, is likely from its advantageous situation to be of much greater importance than it has yet attained. By the Champlain Canal there is communication between Lake Champlain and the St. Lawrence. Sorel is also a railway along the same line of route.

Upper Canada, or Canada West, is divided into 42 counties, as follows:—Addington, population 15,165; Brant, 26,485; Bruce, 2637; Carleton, 51,397; DUNDAS, 13,611; Durham, 26,396; Eastcloth, 39,485; Frontenac, 17,552; Grey, 20,733; Grey, 13,517; Glengarry, 17,926; Grenville, 20,707; Haldimand, 18,788; Halton, 18,328; Hastings, 31,977; Huron, 19,194; Kent, 17,409; Lambton, 10,813; Lanark, 14,375; Leeds, 15,260; Lennox, 7,555; Middlesex, 29,896; Middlesex, 13,339; Norfolk, 21,281; Ontario, 30,576; Oxford, 32,638; Peel, 24,816; Perth, 15,546; Peterborough, 15,537; Prescott, 10,457; Prince Edward, 18,857; Renfrew, 9415; Russell, 2870; Simcoe, 27,165; Stormont, 14,643; Victoria, 11,197; Wellington, 29,537; Wellington, 27,966; Welland, 20,141; Wentworth, 49,619; York, 79,719; population of Canada West, 115,004. Total population of Canada, 1,842,565.

Canada West contains the cities of Toronto, at present the seat of the provincial government, and Kingston. [Tonroor.] 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 1851 was 14,112. The construction of the Burlington Canal, a short cutting which opens a clear navigation into Lake Ontario, and the improvements of the Desjardins Canal, five miles long, which connects Hamilton with the manufacturing town of St. Catharines, has greatly increased the trade of the place. 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 the old Custom-house, and the other used for the post-office and for holding the market. There is a tavern, a
d house, a post-office, and a theatre. A place is places of worship for Episcopalians, Presbyterians, Wesleyan Methodist, Independents, Baptists, Roman Catholics, and others; news-rooms; and mechanics institute. Good roads lead in all directions from the city, and several numerous stage-coaches keep up communication with the surrounding districts. Steam-vessels ply regularly during the season to Toronto and to Queenstown and Niagara. Hamilton has much increased in commercial importance of late years. Kingston, population 11,685, situated on Lake Ontario, distant 199 miles S.W. from Montreal, and 177 miles E. N. E. from Toronto, was incorporated in 1838. It is advantageously situated at the beginning of the Rideau Canal and the Cataract River, and is important in the system of internal navigation, as a commercial point of view, being the key of the central St. Lawrence, as Quebec is of the river's seaward extremity. In its neighbourhood is Navy Bay, a narrow and deep inlet of Lake Ontario, which is the chief naval station on the lake. The market-house, which contains also the post-office, the town-hall, and several public offices, is a handsome stone building of considerable dimensions. There are places of worship for Episcopalians, Presbyterians, Wesleyan Methodists, Baptists, Roman Catholics, and others. There is also a hospital, an mechanics institute, and news-rooms. Ship-building is carried on. A bridge nearly 600 yards long crosses the river Cataract at Kingston. There are several public buildings in the town.
River, population 1830, 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, a bank, a post-office, and many of the habitations. The town is in the neighbourhood of the town. Barrie, population 1837, commenced in 1832, is now the district town of Simcoe district. There are in the town a court-house, a post-office, a district town of Niagara, 48 miles E. from Hamilton, 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 1830, have constructed numerous wharfs and docks, and the Great Western 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 3540, the chief town of Bathurst district, distant about 40 miles W. from Brockville, was laid out by the government in 1816. It stands on the river Ty, which is made navigable to the Rideau Canal by a branch canal about 11 miles in length. The town contains several places of worship, a court-house, and a jail, and many other public buildings. It is a healthy place, and only a few miles from the town. Peterborough, population 2911, occupies a beautiful situation on the Otonabee or Trent River, about 34 miles N.N.W. from Cobourg. It was commenced in 1826, is well laid out, and has a handsome court-house and jail. 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 city-house and jail, a handsome stone edifice. There are here woolens, manufacturers, fulling mills, saw-mills, chair-factories, breweries, &c., Pitson, population 1668, chief town of Prince Edward district, is finely situated on the Bay of Quinté. It is an old town and contains many good stone houses. Steamer calls here on their passages between Kingston and New York. There is a church of worship, a court-house, a jail, and a library. A good deal of trade is carried on. Wheat, flour, butter, leather, &c., are exported. Port Hope, population 2476, on Lake Ontario, about 10 miles S.W. from Cobourg, between Toronto and Kingston, is built on the side of a hill 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 St. Lawrence, about 18 miles N.E. from Brockville, possessed 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 about eight feet deep, but a few miles below the village, where the pearl seams is exported. Sandstone, population not given, lies, sately, on the Detroit River, is finely situated and well laid out. It is one of the oldest towns in Canada, and has a handsome market-place. There are many flower-gardens and orchards are kept by the inhabitants. The Épican and Methodist have places of worship in the town. Simcoe, population 1452, the chief town of Talbot district, is situated near the shore of Lake Erie, about 24 miles S. W. from Brantford. Grist and saw-mills, a carding-machine and rolling-mill, with other establishments, furnish employment. St. Catherine's, population 4388, on the Welland Canal, about 12 miles W. from Hamilton, is a principal station on the London and Hamilton trade. Ship-building is carried on. Great quantities of flour are annually exported. There are six places of worship. Woodstock, population 2112, chief town of Oxford county in the brock district, about 32 miles S.E. from London, is pleasantly situated. It is called brock, and has one of the most pleasant market places in the United States. 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 1841, 9261, as many as 693,628 are natives of Canada of French origin, and 125,560 are Canadians of other than French origin; 61,490 are of Irish origin; 14,686 of Scotch; 12,482 are from the United States of North America; and 11,230 from England and Wales. These are the most important of the E. and W. and the canton, and of our own colonies.

In Can West, the population of which is 822,004, the Canadians of French origin number 26,417, and the Cana-
of the whole of Canada, of which the total population is 1,542,265, the seven principal items stand as follows:—Canadians of French origin, 305,945; Canadians, not French, 561,673; Irish, 227,766; English and Welsh, 92,698; Scotch, 76,511; natives of the United States, 43,732; natives of Germany and Holland, 9837. With respect to the surrender of Canada to Great Britain, the population was chiefly French, and located in the lower province. Although this class has been much increased by immigration, the total number is about 1000 per cent. The progress of Canada West has been still more remarkable. In 1791, the date of the Constitutional Act, the population was 50,000; in 1811 it was 77,000; in 1824 it was 151,097; in 1826 it was 261,060; and in 1824 it was 486,056; 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 1000 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 west of Montreal. The Grand Trunk Line proceeds from St. Thomas 49 miles to New Liverpool, opposite Quebec, and thence by Richmond (where it unites with the line from Portland, in the State of Maine) to Montreal 170 miles, then through a branch southwards to the St. Lawrence and the Upper Lake. From Montreal, by the line proceeding through Prescott, Kingston, and Toronto, to Stratford 421 miles; total 640 miles. The Great Western Line extends from Toronto through Hamilton and Chatham, to Windsor, opposite Detroit, 229 miles. There is an independent line from Niagara Falls to Hamilton 54 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 1846 to 1853, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1846</td>
<td>213,037</td>
<td>389,998</td>
</tr>
<tr>
<td>1849</td>
<td>421,990</td>
<td>370,613</td>
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<tr>
<td>1851</td>
<td>575,923</td>
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<td>1852</td>
<td>622,204</td>
<td>504,742</td>
</tr>
<tr>
<td>1853</td>
<td>733,724</td>
<td>535,171</td>
</tr>
</tbody>
</table>

The imports and exports in each year, from 1846 to 1853, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1846</td>
<td>2,692,584</td>
<td>17 11</td>
</tr>
<tr>
<td>1849</td>
<td>2,648,130</td>
<td>6 9</td>
</tr>
<tr>
<td>1850</td>
<td>3,489,466</td>
<td>5 2</td>
</tr>
<tr>
<td>1852</td>
<td>4,185,409</td>
<td>0 2</td>
</tr>
<tr>
<td>1853</td>
<td>4,185,457</td>
<td>8 5</td>
</tr>
</tbody>
</table>

Canada receives from the United Kingdom, 70% of its imports, 80% of its exports, 90% of its manufactured goods, 95% of its machinery, 96% of its newsprint, 97% of its railway rolling stock, 98% of its coal, 99% of its iron and steel, and 100% of its pottery and glassware.

The exports of Canada are:—To the United Kingdom, pot and pearlashes, wheat, flour, and timber; to the West Indies, sugar, molasses, coffee, rum, and hard woods; to the United States, beef and pork, biscuit, rice, and tobacco.

The imports of Canada are:—From the United Kingdom, coal, iron, machinery, textile goods, and manufactured articles; from the United States, flour, corn, and hides; from Brazil, coffee; from Russia, tea; from China, silk; from India, calicoes; from Japan, silk; from Portugal, tobacco; from France, wine; from Germany, iron and steel; from Holland, machinery; from Belgium, cotton goods; from Italy, wine; and from Canada, timber, flour, and grain.

The government of Canada is a constitutional monarchy, with a Governor-General and a Senate and House of Commons. The Senate is elected for 9 years, the House of Commons for 5 years. The capital is Ottawa.
pretender to the Spanish throne, was the second son of Carlos IV, of Spain, and was born on the 20th of March 1788. Left chiefly in the hands of priests, to whom the superintendence of his education was committed, he lived in comparative obscurity during the dominion 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, regarding Genoa as safe, left Madrid in Spain and made in effect a prisoner, and Ferdinand, like his brother, was soon found himself also in the hands of the French. Bonaparte next compelled the weak ex-monarch of Spain to pro-
cede to France, where, after having spent some time with the French, he was sent to Vienna, where he was placed in a hotel, and was then under the hands of the Quen and the subsequent rising in favour of the Count de Montemolin was easily suppressed. Don Carlos was permitted in 1847 to remove to Trieste, where he remained in fact a prisoner till his death, March 10th, 1856.

CARRICK. [ARMS.]
CARRICK-ON-SHANNON. [Lisburn.]
CARRICKMACROSS [Monaghan.]
CASHHALTON. [Syrac.]
CARDHA. [Lisburn.]
CASEARIA, one of the five genera of plants constituting the natural order Sambuceae. Several species of the genus are used medicinally. The leaves of C. sitifolia are astrigent, and in the Brazils are applied to recent wounds. A decoction of the leaves of C. tonca, called by the Brazilians Cha de Frade and Lingua de Fin, is used in fevers and inflammatory disorders. C. astrigera is used as an external application on account of its astrigent properties. C. Anamans, a species of C. eucalyptus, is eaten, but the root is bitter and purgative.

CASEIN. [Chemistry. S. L.]
CASTAÑOS, FRANCISCO XAVIER, the most eminent Spanish general in the Peninsular War, was born at Madrid, 24th February, 1766. His father, who was a military officer, procured him a captain's commission at the age of twelve, and he remained in the service till he was ninety-six, being then probably the oldest soldier on record. In his early years he was sent with General O'Reilly to the court of Fréderique the Great to learn the Prussian tactics, and he passed through various grades in the Spanish army without achieving any high reputation till the invasion of Spain by Napoleon I., when he was fortunate enough to furnish an example of series of victories against the French, which terminated in the downfall of their power. On the 32nd of July 1808, eighteen thousand French, commanded by General Dupont, laid down their arms and surrendered to the Spanish army, under Castaños, at B. ylen. It is stated by Lord Holland, in his 'Reminiscences,' that when the French general delivered his sword to Castaños, he said, "You may well, General, be proud of this day; it is remarkable that I have never lost a pitched battle till now; I have lost my army.

"It is the more remarkable," was the Spaniard's quiet reply, "because I never was in one before in my life." The chief merit of the victory has, however, been ascribed by many to the second in command, Aloya Reding, a Swiss patriot, who, from the time he defended the gates of Madrid, when Napoleon had entered the service of Spain. The effect of this great battle was to drive Joseph Bonaparte from Madrid, and on the 23rd of August Castaños made his triumphal entry into the capital, where, on the next day, Ferdinand was proclaimed. Later in the same year, in November, Castaños was defeated by the French at Túmeda, and he held but a subordinate position to the Duke of Wellington and Marshal Beresford during the remainder of the war.

Luis Philippe assigned him a residence in the city of
Bourges, 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 Spanish crown in favour of his eldest son Don Carlos Luis Maria Fernando, Count de Montemolin. 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 Genoa and the hands of the Qen and the subsequent rising in favour of the Count de Montemolin was easily suppressed. Don Carlos was permitted in 1847 to remove to Trieste, where he remained in fact a prisoner till his death, March 10th, 1856.
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C A S

Ferdinand, who was very fond of him, circulating amongst the lower classes. Among other postures of dignity, he held the title of Count of Barajas, a member of the royal family of Spain. He died at Madrid, on the 24th of September, 1853, and his remains were lamented with a public funeral.

CASTEL VETRANO, a town in the province of Trapani, in Sicily, is situated near the left bank of the Delta, 30 miles E. from the town of Trapani, about five miles from the nearest point of the south coast of the island, and has a population of about 13,000. The town is famous in works of coal and alabaster. It is built on a hill, and is an old city, several churches, convents, 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 Selinum. This ancient city is covered with broken columns, capitals, and palaces. The ruins are of Doric, and of large dimensions; they are called 'Giants' Pillars' by the peasantry. A few columns are still standing. Some finely sculptured metopes were discovered at the base of the façade of the central temple in 1822. There are ruins of six temples in all.

CASTELLAMMARE, the chief town of a subdivision of the province of Naples, in the kingdom of the Two Sicilies, is situated near the head of the Bay of Naples, on the lower slope of a low hill, at an elevation above the level of the sea of 634 feet (or about 200 metres). The town is 15 miles by railway 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 railway opened in Italy, on the banks of the river Agri, on the one side, and the mountains of the Olympos on the other, which was ruined by Sylla in the Social War, and afterwards covered by ashes from 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 Quiri-senna, from its shrub livery; it is covered with villas and cottages; among the latter is the royal casino of Qui-senna, founded by Charles II. of Anjou, and now the property of the Russian prince Lieven. Behind the hill rises the imposing mass of Monte Sant'Angelo, which with a circumference of 28 feet is perfectly bare and without vegetation, 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 emperor 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 1654 by the Duke of Guise. The harbour has a depth of three to four fathoms with a good anchorage, protected by a 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 to the prosperity of the town. Castellammare has been celebrated since the time of Galen, for its mineral springs, which are very efficacious in gouty and rheumatic afflictions. There are twelve of these,—four chalybeate, four saline, and four sulphureous,—and they all rise at the base of the Monte d'Auro, within a short distance from one another. They are all of moderate temperature, and 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 on a shelved beach commanding a view of the whole bay of Naples. The town is celebrated for the fertility of its soil, for its coal, timber, and machinery. Among the industrial products are macaroni, silk and cotton goods, and sail-cloth. The fisheries along the coast employ a good many hands. Some excursions are made among the ruins of Stabiae in 1745 brought to light a few remains of sculptures, some pottery, and paintings, which are now in the Museum of Naples.

There is another Castellammare, or Castellammare, in the province of Trapani in Sicily. It is situated on the southern slope of the Monti Segesta, from the town of Trapani, 17 miles W.S.W. from Palermo, and 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 gravel and lime. The remains of the ancient Segesta are near Castellammare; they consist of a Doric temple in tolerable preservation, the ruins of a theatre, and a part of the city wall. Castellammare would not have been of the importance of the port of Segesta [Trapani] had not the town been destroyed by a water-spout in December, 1851.

CASTLE ACRE. [Norfolk.]

CASTLE BLAYNEY. [Monaghan.]

CASTLE CARY. [Somersetshire.]

CASTRENN, MATTHIAS ALEXANDER, one of the heroes and martyrs of modern philosophy, was born on the 2nd of December 1813 in the province of Uus-vo in Finland, not far from the boundary between Finland and Lolland, a little island which belonged to Sweden, and is now a part of Denmark. The manor house which he occupied was usually resort to visit the peasant men of the midnight sun. He received his early education at Tornoe, and afterwards went to Helsingfors to pursue his studies at the university, where he was removed to the university after the conflagration of Abo. One effect of the transfer of Finland from Sweden to Russia had been to lessen the importance of the Swedish language, which had up to that period occupied much the same position in Finland which the English does in Wales, but which then ceased to be the language of the government, though it continued to be that of the educated classes. A lively interest was awakened in the Finnish, the old language of the country, which is still spoken by the peasantry, and which some recent philologists have recently been investigating and discussing in Europe. Of the students at Helsingfors who followed up this study none were more enthusiastic than Castrén. He made a resolution to devote his life to the language and literature of his country, and undertook this an ideal vocation. He commenced a course of inquiries into the mythology of ancient Finland, and found that to complete his views it was desirable to ascertain with more exactness than had hitherto been thought requisite the mythology of the Laplanders, he looked about for the means of making one journey into Lapland, and studying the language and religion of the Lapps. In 1838 an opportunity was presented itself, and he set out with three companions on a tour, which before its completion took him to Utsioki and the great lake of Enä. The journey was, however, not without disaster, for he broke all their stores on their backs, and their journey both out and home was an almost uninterrupted series of labours, hardships, and privations. Castrén could learn less of the Lapland mythology than he had expected, for although the conversation of many of the tribes from heathenism had only taken place in the 18th century, the Christian Lapps were so devout that they often spent twenty-four hours in succession in religious exercises, and many of them knew the whole of the Lapland mythology by heart. Although his observations were regarded with proportionate abhorrence. On his return he learned that the Imperial Academy of Sciences at St. Petersburg contemplated sending an expedition to Siberia to prosecute researches in ethnology, and he pushed himself in consequence to become a fellow-citizen of his newly founded fellow-philosopher Sjögren to undertake the task. For the time he was disappointed; but the Literary Society of Finland raised a scanty subscription to send him on a mission to Russian Castrén, to collect lillas, legends, and traditions illustrative of his favourite Finnish mythology, and he was remarkably successful. Soon after his return in 1841, he published, at Helsingfors, a transliteration into Swedish, in the metre of the original, of the great Finnish poem 'Kalevala,' the discovery of which by Dr. Lounrot, who first noted part of it down from the lips of the peasantry, has made an epoch in the history of Finnish literature. It was this translation that first brought the poem into general note; and, certainly, since this time, it has been the subject of serious examination, of discovery of the kind, real or supposed, has produced an equal sense ion. 'Hiawatha,' the recent poem of Professor Longfellow, though purporting to be an embodiment of the traditions of the North American Indians, is borrowed from the 'Kalevala' in its general style, in its peculiar metre, and even in its more prominent verses. Soon after its publication Castrén set out on his third philological journey, which appears to have been made in his coat and at the expense of Dr. Lounrot, and afterwards found his way to Utsioki, and finally to E. coast. He visited first to his old quarters at Enä, then to Kola, the capital of Russian Lapland, and finally to the Somoyed on the coast of the White Sea. Here, with only fifteen rubles to keep him from starvation, he struck up an acquaintance with some of the native Somoyed, and acquired an occasional glass of brandy undertaken to teach him the Samoyed language; and in the heat of this man he passed
nearly the whole of a summer, engaged in the study. Towards the end of his travels, which lasted for four years, from 1845 to 1849, he crossed the Tundras, or deserts of European Russia, between the White Sea and the Ural, where not even the rein-deer can feed without the wiry blast and live. Philology has its martyrs as well as religion. Castrén returned with his constitution ruined.

While on his travels he had written most interesting and amusing letters of his adventures and discoveries, which were printed in the 'Soomi,' 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 'Bibliotheca,' the learned periodical of the Swedish Academy, and 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 introduced to the position of a 'private-docent,' or private tutor, to that of professor of the Finnish and old Scandzinavian languages. One of his duties was to deliver a course of lectures on Finnish mythology, which he immediately commenced composing, but before they could be finished he was no more. He died at Helsingfors on the 7th of May, 1853, from the effects of his smoked journey.

The translation of the 'Kalevala,' and some of Castrén's other works, have been already mentioned. His lectures, 'Vedtheres ädelspråk,' in which the whole of Finland comes over the desk in its bearish philological character:—'Elementa Grammatices Thromione,' 'Koepio, 1845, 8°; 'Elementa Grammatices Syrjovne,' Helsingfors, 1844, 8°; 'De Affilia Personum Lignarum Altaicarum,' Helsingfors, 1850, 4to. There is also an Osian Grammaticon, containing a portion of a work called 'Nordische Reise und Forschungen,' which was commenced at St. Petersburg in 1840. It need hardly be added that all these works are of the highest value to those who take an interest in what is called the Ugrian family of languages, possessing some curious views of old man and woman, and other dialects scattered over the surface of European Russia, toinvestigate 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.

CATALYST. [CATHYNT, S. J.]

CATAMACA, one of the upper provinces of the Argentine Central Division, was described by N. and N.E. by the province of Tucuman, E. by Santiago, S. by Cordova, and S.W. by L. Rioja, and comprehends the little visited country between the mountain ranges of the Sierra of Aconcagua and Ambato on the east, and the Andes on the west. The inhospitable country, in which there is neither soil nor water, is bounded by a principal valley, Catamarca, 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 southern extremity on the borders of the Gran Salina, being thus separated from the other inhabited countries by high mountains and deserts. The rivers which water these valleys are lost in the Gran Salina. The climate is enjoy, especially when there is a south-east wind, called the 'Maiz.' Maize and wheat are raised to a considerable extent, but cannot be exported over the mountains. The province sends caiy cotton and red pepper (dried capucium) to the adjacent countries, the latter chiefly to Buenos Ayres, where it is extensively used in the preparation of the native drink 'Mate' or 'Chimango.'

Fernando del Valle de Catamarca, in 28° 28' 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 an Indian insurrection.

CATHA, a genus of plants belonging to the natural order
Celastraceae. O. edulis is the Kat or Khalt of the Arabs. "It would appear," says Dr. Lindley, "to be of a stimulating character, and has been long esteemed by the Moors, who leaves with greediness, believing them to have the power of calming extreme watchfulness, so that a man may stand entry all night long without drowsiness. They also regard it as an antidote to the plague, and assert that a person wearing a twig of it in his bosom may go among the infected with impunity; they even believe that the plague cannot appear in places where the tree is cultivated." ('Vegetable Kingdom,' p. 867.) At the same time Forskail adds, "The taste of the leaves does not seem to do harm to the human body in such virtues." CATHARINE'S, ST. [CAMA, S. A.]

CATHCART, LIEUTENANT-GENERAL THE HON. SIR GEORGE, K.C.B., was born in London, on the 19th of July, 1814. He entered the 64th Foot, as a Second Lieutenant, in 1832, and was appointed Captain, in 1837. He was graduated Lieutenant-Colonel, in 1847, and Major-General, in 1857. He was married to Mary, daughter of William Shaw, the first Earl Cathcart. He was educated at Eton College, and entered the University of Edinburgh; and in 1810 he began his military life by joining the 2nd Life Guards. In 1818, by which time he had been promoted to a lieutenancy, he accompanied the expedition which also was sent to the semi-independent country of Russia. When thay arrived the French were already in possession of Moscow, and when the Emperor Alexander took the field in person in 1813, Lieutenant Cathcart joined the imperial army. He was with the grand army throughout the campaigns 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 Napoleon I., as displayed in the battles, published a volume of Commentaries in 1860, from the facts collected during these campaigns, accompanied with diagrams showing the position of the armies, with their movements. It is a valuable work, additional interest being given to it by an introduction to the history of the powers of Europe, which constituted the French, and displaying the effects of national character under the different circumstances of attack and defence. In 1814 he again accompanied his sovereign to the field, who was one of the three plenipotentiaries sent to Vienna. On the return of Napoleon he was appointed aide-de-camp to the Duke of Wellington, and was present at Quatre Bras and Waterloo. He was in the appointment when the Duke became master-general of the Ordnance, and accompanied him on the mission to Aix-la-Chapelle, Verona, and Berlin. In 1828 he had arrived at the rank of Lieutenant-Colonel, and served for about eight years in Nova Scotia, Bermuda, and Jamaica. In 1834 he retired on half-pay; but in 1857 was recalled into active service on the outbreak of the outbreak 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 1858, 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 troops over to Canada, as a mark of the confidence reposed in him by his profession. He however had short time to display his capabilities. In the battle of Inkermann, on the 5th of November 1854, where he displayed the most heroic bravery, a sabre wound made his eye so useless that he was rendered so superior that it failed in the desired effect, he fell, together with the other leading chiefs. He was buried on the spot—Cathcart's Hill—with 11 other officers who had fallen.

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

CAT-MINT. [CATHYNT, S. A.]

CATH-A-EYE, a form of Chalcedony, of a greenish-gray colour, having a peculiar opalescence, or glaring internal reflections, like the eye of a cat; it is also called Ash-Tree Agate. It is a form of quartz in which the growths of asbestos come from Ceylon and Malabar, and possesses considerable value as a gem. (Dana, Mineralogy.)

CATHYNT, TAIL GRASS, the common name of Philonema semen, an agricultural plant, also called Timothy Grass. (Philom.)

CAUCHY, AUGUSTIN LOUIS, mathematician, was born at Paris, Aug. 21, 1789. His father, Louis François Cauchy, was a poet, and became archivist of the Chamber of Peers. The family was of old family stock. In 1804, while at the Ecoles Centrales, he was crowned by the Inquisite as the pupil who had carried off most prizes, among which was the first in Latin poetry. In the following year he entered the Ecole Polytechnique as second scholar,
and in 1806, when only in his seventeenth year, his solution of a difficult problem was printed in the 'Correspondance' of the school.

From the Ecole 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 engineer of the works for the port of Cherbourg; the first time this date commences his long series of mathematical researches in questions previously unsolved. Among the first was his demonstration of Euler's celebrated theorem on the polyedra. In 1813 he published his 'Méthode pour déterminer les maxima et les minima des fonctions dérivées.' 'Extraction d'un dgré quelconque,' which was followed by papers on the properties of integrals, taking up questions started by Clairault. In 1816 he received the grand mathe-
nomical and physical prize, and the Institute for his paper 'Sur la Théorie des Intégrales,' which became the basis of a theory of light.

In 1816 Cauchy was elected as a member of the Academy of Sciences, and was appointed professor of mechanics in the Ecole Polytechnique, and in the same year he published his demonstration of Fermat's the-rems 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 as 'Leçons sur le Calcul Différentiel,' 1826; 'Leçons sur les Applications du Calcul Infinitésimal à la Géométrie,' 2 vols. 4to, 1826-28. At the same time he continued his valuable series of papers for the Annales des Sciences Mathématiques, which are labeled 'Sur les Limites Imaginaires,' 1826; 'Sur l'Application du Calcul des Residus à la Solution des Problèmes de Physique Mathématique,' 1827; 'Sur la Résolution d'Équations Numériques, et sur la Théorie de l'Elimination,' 1829; 'Sur la Théorie des Désordames,' 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 these circumstances he accepted the post of Judge of the King of Sardinia, which invited him to deliver a course of physico-mathematical lectures at the university of Turin. In 1833 the Royal Society of London elected Cauchy one of its first foreign members. In the following year he received an invitation from Charles X. to undertake the scientific education of the Duc de Bordeaux, who then reigned at Prague; and he cheerfully devoted himself to the task. While thus engaged he resumed in 1835 the publication of the Annales des Sciences Mathématiques, 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 an active part in the scholarly schemes for training a superior class of professors in the interests of science, of which he was destined to be a member of the bureau des Longitudes 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 may best be judged of by reference to the '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 Liouville's 'Journal de Mathématiques,' among which his Note sur le Développement des Fonctions en Série ordonnées suivant les Puissances ascendantes des variables, published in 1841, is of great moment. In 1846 a professorship of mathematical astronomy has 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 1825 as a condition for his appointment, again compelled him to forego the advantages attaching to this post. As a recompense he was allowed to continue his studies; adding every month to the number of his works. He treated of the higher branches of algebra, the theory of numbers, the infinitesimal calculus, mechanics, astronomy, and many other sciences, explaining in fact every branch of mathematical analysis. Of him it was said that he mastered the entire domain of mathematics, and never exceeded 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 positions of science, by simplifying and strengthening them, as in all parts of geometry, and by giving a elegant demonstration of the fundamental theorem of the theory of equations.
Claudius is an exceedingly interesting book. At the opening of this book, the tunnel is about 20 feet high and 20 feet broad; but its course increases considerably as it advances through the mountains. 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. Water for the latter substance occurs, but the former water is supported by a marble or marble-ware drain. To admit light and air the Romans sunk 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 west-north shore of the lake.

**CELIIDGE.** [Kildare.]

**Ceili.** The ultimate structure of animal and vegetable bodies consists of minute vessels, which are called Cells. In both cases there is the structure made up of a wall, generally visible to the naked eye, as they vary from the 1-50th to the 1-10000th part of an inch in diameter. In all cases they consist of an enclosing membrane or cell-wall, which includes in a space more or less enlaid within its 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 called by different names from those mentioned by the ancients for inorganic or mineral bodies, which are called physical. It will, however, be seen that independent of the formative power by which particles of gelatin, cellulose, etc., arrange themselves into cells and which inclose themselves into the forms of organs and beings of a specific form, there are few of the functions performed by cells which may not be referred to the action of physical forces. One of the first and most necessary conditions of the cell is that it has a passage or passage through 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 the organisation of their function. This function, which is called Assimilation, refers to the chemical relation existing between liquids and gases and the membranes 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 transmuted in compound structures from cill to cell without undergoing any great amount of change. In other cases, the materials are modified in such a manner that their properties are changed. The cells of some parts of vegetable structures are an instance of the latter, in which carbonic acid and ammonia are absorbed with water, and converted, either during their passage through the cell-wall, or whilst in the interior of the cell, into cellulose or the structure of the actin, the cell-wall of the cell. In other parts of plants the cells convey solutions of sugar 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 proper assimilates 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 some agent of cells, which form an organ or a body, and has been called the assimilative force or property, 'organising force,' 'organic force,' 'plastic force.' It is necessary in this process to separate between the chemical and the physical changes which occur, and which is probably the result 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 specific force in the case of each cell, plant or animal changes take place in the elements introduced. The cells of some parts of vegetable structures are an instance of the latter, in which carbonic acid and ammonia are absorbed with water, and converted, either during their passage through the cell-wall, or whilst in the interior of the cell, into cellulose or the structure of the actin, the cell-wall of the cell. In other parts of plants the cells convey solutions of sugar and other substances without producing on them any change.

The result of the appropriation of the new matter absorbed from outside the cell is their enlargement or growth. This takes place in two ways: either the new matter is 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 of the cell-wall, but this is the first mode of growth is remote 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 lower forms of plants, and the less organised tissues of animals, as cartilage, up to the elongated vessels of the plant, and the irregular cells of bone or vascular 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 terms Metamorphoses or Transformations have been applied to these changes. As examples of these cells we may quote—the horny scales of the epidermis, of the hair and the nails, and the laminated pavement, epithelium—as white of the ovum, and the cell-wall is fused into one mass with the cell-content; the contractile fibre-cells of the smooth muscles; the tubules of the lens; the prisms of the enamel; the various forms of bone-cells; and the transmitting cells of the animal kingdom. All cells originate or are 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 the nuclei, 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 nucleus, or of an expansion on the interior of the cell, when it is called the prismatic uricle. Free cell-development has been observed in other fluids about to undergo the fermentation process, 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 cells under these circumstances are supposed to originate have not 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 prismatic uricle. In the animal kingdom development of cells can frequently be seen to take place around the nucleus, whilst in the vegetable kingdom its origin is more frequent from the folding in or contraction of the prismatic uricle upon itself, by which means two cells originate in one.

The development of cells around the nucleus and round the investing membrane, or prismatic uricle, within the walls of the cell, a multiplication of cells frequently takes place by division of the whole cell. This takes place in many of the lower forms of animals and plants [Pavert., S. 3], and also in the red blood-corpuscles of the embryos of birds and mammals, and in the coluires blood-corpuscles of the tadpole. It is probable that further observation will extend our knowledge of this mode of cell-development.

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 Kühne as an attempt to follow Bechmann's views as to the analogy between chemical 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 of the contents with a nucleus appears. 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 nucleus, and the occurrence of the formation of cells in this manner is thrown into an analogy with chemical changes in inorganic bodies and those which occur in cells.

3. In cell-development around portions of contents, and in the cleavage process, the nuclei also operate as simple centres of attraction upon a certain mass of blastema, and then follow the separation of a membrane upon the uterus, into which mass, which 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 develops directly into an intermediate mass. 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 result of organisation may be described as the establishment of the cells to constitute the mass of the body, but by their agency alone all 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
material at the head is the nucleus of the cell and the
agency of cells. Nor are these last functions peculiar
to the animal kingdom. Contractility and sensibility seem to
be the property of the substance (protein) of which the nucleus
and plant, animal, and microbe are composed.

In 19th century it is thought that the historical
classification of animals by Linnaeus, which does nothing but
repetitively repeat itself; the other element, the periplasmic
substance (the cell membrane) being subject to all of the
chemical and morphological metamorphoses, in consequence of
which specific tissues arise. The differences between the
substances and the phenomena in the body of the
animal, and, as the prismatic urticaria, attains a large
cosmopolitan aspect; while in the animal the Endoplasm remains
small, the principal bulk of its tissues being formed by the
substance of the

This distinction however does not always hold good,
the Austrian furnishing examples of animals whose periplasmic
substance contains cellulose.

In 19th century, each plant is a stone, each stone is a
wooden case, and nature, like Sycorax, holds thousands of
delicate areas imprisoned within every oak. She is jealous of letting us
know this; and among the higher and more conspicuous
forms of plants reveals it only through obscure manifestations
which are required to certain principles inherent in the
Dinosaurs, or, still more slightly, by the phenomena of the
Cyclusis. But among the immense variety of creatures which
belong to the invisible world she allows more liberty to her
darlings; she is less scrupulous in the Fossil, and indeed all the
species are during one period of their existence as active
animals of a like grade in the scale. True, they are doomed
eventually to shut themselves up within their wooden cages and remain quiescent; but in this respect they are no worse
than the cell.

For further information on the subject of Cells, see the
articles Histology, S.I.; Cell, S.I.; Tissues, Organic, S.I. (Sharpey, in Quain's Elements of Anatomy; Köhler, Handbuch der Human Histology, translated for the Sydenham
Society by Huxley and Buck; Carpenter, Manual of Human
Physiology; Principles of Physiology; Mohr, On the Vegeta-
table Cell, translated by H. Hiern; Schiedel, Principles of
Scientific Botany, translated by Lankester; Schiedel, On
Microscopic Anatomy, translated by J. E. Balfour; Plate and Animals, translated by H. Smith for the Syden-
ham Society; Qckett, Lectures on Histology; Hawson,
Microscopic Anatomy of the Human Body; Todd and Bow-
man, The Physiological Anatomy and Physiology of Men;
Eppinger, Histology of Plants and Animals; Journal of the
Royal College of Surgeons, London; Quarterly Jour-
nal of Microscopical Science; and Transactions of Micro-
scopical Society, vol. 1.)

CENSUS OF 1831.

The Census of Great Britain in 1831
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 had been sufficiently indicated in former
volumes of the "Penny Cyclopaedia," here, therefore, before
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, that the time of Parliament, what the Census of
1831 sought to accomplish:

"At the present Census it was resolved to exhibit not
merely the statistics, as before, of parishes, and, more com-
pletely, of parliamentary and municipal boroughs, but also
of such other large towns as England and Scotland and as
appeared 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 period under review, been ascertained or
eclesiastical districts. In addition also to the inquiry concerning
the occupation, age, and birthplace, of the population, it was
determined to ascertain the various relationships (such as
husband, wife, son, daughter)—the civil condition (married,
widowed, or child), and the number of persons
blind, or deaf and dumb. Further, under the impression
that the fifth section of the Act would authorize such
an inquiry, the design was formed of collecting statistics as to
women, by the assistance of the various religious bodies and
other places of public religious worship throughout the
country, and the number of persons generally frequenting
them; and also as to the existing educational establishments,
and the actual number of scholars under instruction. It was,
however, subsequently considered, on account of the rigid
construction of the Census Act rendered it compulsory
upon parties to afford information upon these particulars;
and the inquiry was therefore put aside as a purely voluntary
inquiry, open to the discretion of the城镇's registrars. At
former Census, any abstract of the parish registers for
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 trust-
able information as to the changes in the population,
the Census was required to report to the Parliament the
populatio-

For obtaining these objects, the local machinery introduced
in England and Wales by the Poor Law and Registration
Acts was involved, and the general direction of the Census,
under the See of State, given to the Registrar-
General. The 684 Registration Di Lists, into which England
and Wales was divided by the Registration Act, each having
a superintendent registrar, are subdivided into 2150 B. di-
lists, and 3100 C. districts.

These districts were, for the purposes of the Census, and
under the superintendence of the registrars and superintendent-
registrars, again divided into 30,810 Enumeration Districts,
a
such district being assigned to one enumerator, who was
ordered to enumerate all the population of the
land, where no such local machinery existed, the Census
was taken in the course of the solicitors of counties and
chief officials of boroughs, the king of the Act being
required to appoint in each parish one or more
inhabitants, generally the parochial schoolmaster, in each
parish to divide it into convenient enumeration districts, and
superintend the proceedings of the Census thereon. The
number of enumeration districts formed throughout Scotland,
in 1831, was 9,641, and in the Isle of Man, 298, the
enumeration districts were similarly formed. Of the mode of
taking the Census, it will suffice to say, that blank-forms
were left at every house and public institution, with minute
directions, in order that they might be correctly filled up with
the requisite information concerning every person who was
in the house or apartment on the night of March 20, 1831.
These forms were collected by the enumerators on the 21st of
March; each enumerator being directed to satisfy himself,
and in no case as power of levying fines on the
conut that the returns were properly and accurately
inaccurate to correct them. The vast importance of
the method adopted, as a security for the accuracy and precision
of the returns, will be best understood by a comparison
with the method adopted in taking the Census of the United
States in 1820, and dated the 20th of October, 1820. The
States comprised an area of 3,300,000 square miles. To
number the inhabitants occupying that vast space the entire staff
of superior and subordinate officers employed numbered only
2260 persons, less than one-tenth of the number employed for
enumerating the population of England and Wales, a territory
of 48,320 square miles, or less than a fifty-sixth of the area
of the United States. It is at once evident that the American
census could not be made on one day, and accordingly
we find that though the schedules were directed to be filled
up with reference to a particular day, the officer did not
call at the house, the inmates of which were to be numbered,
till some days, weeks, or even months after the time specified;
when, on the contrary, in the Census of the British
States were required to come in advance of the Census, and
the returns were required to be furnished under the force of
law. On the whole, it is evident that the American
census could be made by the strength and careful appointment of
the official staff, and the strictness with which their duties
were defined, the arrangements for the Census of the British
States were in all respects admirable, and probably the returns
were made with a far greater accuracy and greater
trustworthiness. It may serve to show the amount of labour
which was involved in this army of enumerators (including Scotland,
particularly 39,000 in number), to state that the blank-forms for
England and Scotland were issued to the amount of 18,350,000,
and in all to nearly 7,000,000, the weight of them
being nearly 40 tons: the 'weight of the schedules, blank
enumeration books, and other forms, despatched from the central office, exceeded 25 tons.* The schedules, after being brought to London, were subjected to revision by the registers of the Customs, the Admiralty, and the Registrar 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 accurate and regular than in the enumerations of the 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 strength of the Indian army, navy, and marines, of Cheesemonger and Greenwich pensioners, of officers 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 20,959,477; and the men in the army, navy, and East India Company's service, abroad, on the passage out, or round the coast, belonging to Great Britain, on the same day, was 3,578,552. The total population of Great Britain, in May of the previous year, was 20,651,066. It was 318,369 females to every 100,000 males; in 1851 it was 103,363 females to 100,000 males. At both periods there were somewhat less than 30 men to 31 females. In 1851 there were 20 men at home to 31 females. The excess of births, however, is in the opposite direction. The 13 years (1839-51) in which accurate registers of births have been kept, there have been born 3,834,233 males and 3,163,029 females, or about 105 males to every 100 females (101,865 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 degree of the dangers and diseases to which they are respectively exposed, this is not the place to consider.

The increase of population in the last half century nearly reached a new nation 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 93.7 per cent., or at the rate of 1.299 per cent. annually. "The annual increase, however, has varied in each decennial period; it increased from 1.574 per cent. on the population in 1801-11, to 1.489 (nearest 1.49) in 1811-21, when it was at a maximum; the annual rate of increase in 1821-31 was 1.408; in 1831-41 it fell to 1.279; and in 1841-51 to 1.186 per cent. annually. The population therefore is increasing, but the rate of increase has diminished since 1821, caused by little emigration, and the mortality in England was lower than it has ever been before or since, down to the two last decennaries; when the public health has suffered from epidemics of influenza, cholera, and other diseases; while emigration from the United Kingdom has proceeded at an accelerated rate from 274,300 in 1821-31, to 718,000 in 1831-41, and 1,093,000 in 1841-51." During the same period the proportion of land to each person has decreased in Great Britain from 7,512 acres in 1801, to 6,972 acres in 1851; from 4 acres to 2 acres in England and Wales.

If the rate in which the population has increased since 1801 continued to prevail uniformly, the population would double itself in Great Britain every 52 years; in England and Wales, every 45 years.

The number of families in Great Britain in 1801 was 2,260,602; in 1851 it was 4,312,888; being an increase of 2,052,286. The families in England and Wales in 1801 were 1,856,733; in 1851 they were 3,712,880. In Scotland they were 394,078 in 1801, and 6,886,921 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 4:825 persons in a family. In Scotland in 1851 the average of persons in a family was 4:814; or more than the average of 4:645 in Great Britain. The average number of families in a house was somewhat higher—1:381. In Glasgow the number of families to a house is 5:4; of persons to a house, 2:75; Edinburgh the coro-pounding numbers are 4:2 and 20:6; in Aberdeen, 3:1 and 19; in Dundee, 3:2 and 10:7; and Perth, 2:9 and 12. In London, on the other hand, the numbers 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, in post of being the result of a natural increase of the population, 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 sets of chambers must not 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 in the 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 single persons, pensioners, hotel-lodging, &c. The following is an analysis of the families in connexion with the houses which they occupy in 14 subdivisions of England, containing 35,876 inhabited dwellings, in which the number of the houses (1,650 of the houses having the families absent), comprising 242,164 persons, or, on an average, nearly 7 persons to a house—5 to a family. Of these houses, 20,369 contained one family; 4,789, two families; 1,023, three; 745, four; 425, five; 224, six; 117, seven; 83, eight; 38, nine; and 28, ten families and upwards. This analysis is in the Report carried out with great minuteness into a variety of particulars, but which it is impossible for us here to follow.

The number of houses in Great Britain in 1851 was—
inhabited, 3,670,192; uninhabited, 166,735; building, 29,194. In 1801 there were 1,882,476 inhabited, and 67,330 uninhabited; the number building was not returned. The following tables show (1) the number of principal public institutions,—of the houses of officers and servants; and (2) the number of persons sleeping in barges, barns, tents, and vessels.

<table>
<thead>
<tr>
<th>Institutions</th>
<th>No. of Persons</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barracks</td>
<td>174</td>
<td>55,933</td>
<td>44,833</td>
</tr>
<tr>
<td>Workhouses</td>
<td>745</td>
<td>131,392</td>
<td>65,786</td>
</tr>
<tr>
<td>Prisons</td>
<td>257</td>
<td>32,044</td>
<td>22,380</td>
</tr>
<tr>
<td>Lunatic Asylums</td>
<td>149</td>
<td>21,004</td>
<td>9,735</td>
</tr>
<tr>
<td>Hospitals for the Sick</td>
<td>118</td>
<td>16,417</td>
<td>5,595</td>
</tr>
<tr>
<td>Asylums and other Charitable Institutions</td>
<td>573</td>
<td>46,731</td>
<td>27,183</td>
</tr>
<tr>
<td>Total</td>
<td>2,017</td>
<td>295,856</td>
<td>178,941</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Persons in Barges</th>
<th>No. of Persons</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barns</td>
<td>12,924</td>
<td>10,385</td>
<td>2,539</td>
</tr>
<tr>
<td>Open Air in Tents</td>
<td>8,277</td>
<td>4,614</td>
<td>3,663</td>
</tr>
<tr>
<td>Yards in the Ports, engaged in Inland Navigation</td>
<td>8,575</td>
<td>7,739</td>
<td>845</td>
</tr>
<tr>
<td>Sleeping Vessels in the Ports</td>
<td>43,178</td>
<td>41,185</td>
<td>2,003</td>
</tr>
<tr>
<td>Total</td>
<td>62,291</td>
<td>71,155</td>
<td>11,766</td>
</tr>
</tbody>
</table>

* "The enumeration of the houseless population, unsettled in families, is, however, necessarily imperfect; and the actual number must exceed the 15,849 returned, namely 9,972 in barns, and 5,877 in the open air. It is mentioned
in one instance that a tribe of gypies struck their tents and passed into another parish in order to escape enumeration. In 1841 the number of the houseless class was 23,303: owing to the more advanced period of the year (June 7) at which the Census was taken, many isolated people and labourers were then engaged in the hay harvest."

From houses and families we ascend to towns and corporations. No attempt was made to classify the smaller aggregations of houses by defining villages, hamlets, &c.; but 17,150 places were thus marked on the returns at a price or by a name, 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 5 miles from the nearest town, or 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; central county towns was surrounded on 105 miles to the side, a circle having a radius of nearly 6 miles; so that the population of the country around is, on an average, about 4 miles from the centre."

"The population amounted to 31,566,856 in the 815 towns that were marked out in 1803, 3,154 miles of area. An average town of 19,623 inhabitants stands on an area of nearly 4 square miles; equivalent to a square of 2 miles to the side, a circle 1.5 miles to a radius; and the population is less than three miles from the centre."

"The population in the rest of Great Britain was 10,403,159; 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 towns and country population, in the British Seas, they so little in numbers, that they may be considered equal, for by the abstracts 10,556,855 people live in the towns, and 10,403,159 in the country. In the towns there were 52 persons to an acre, in the country 53 acres to a person. The density in the towns stands at 13.5; in the towns—5,337 persons to a square mile."

"The 815 towns are grouped around 87 county towns—59 in England, 32 in Scotland, and 3 chief towns, equivalent to county towns, in the Islands of the British Seas. Each of the towns having an area from one to ten persons that can be considered as equal with the average of the British Seas; they were 35 miles apart. The population of the county towns of Great Britain, and the chief towns of the Channel Islands amounted to about 602,647 in 1801, and 1,359,583 in 1811; in England and Wales the population of the county towns was 1,65,647, and the total of all the lesser manufacturing towns—Sheffield, for instance, which is among the most important, stands 1,352, 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 asunder; the mean distance was 106 yards asunder; the mean distance apart of the houses in 1801 being 362 yards, and 552 yards in 1811. Or, as it may be otherwise expressed, on the same area the population has doubled; the proximity has increased—the separation diminished. In the case of the small towns the proximity the mean the population increased from 918,635 to 2,362,236, being an increase of 1,403,373, or 146 per cent.; Manchester (with Salford) from 84,786 to 401,316; Liverpool from 82,285 to 376,955, its opposite neighbour Birkenhead rising in the same time from 110 to 24,285; Birmingham from 32,614 to 153,714, and from 15,174 to 69,884; Bradford from 13,364 to 103,778; Plymouth from 16,040 to 32,821; Southampton from 7,913 to 35,305; Merthyr Tydfil from 10,127 to 63,080; Glasgow from 77,058 to 329,007; and other manufacturing, mining, and sea-port towns, the (2) towns which are in mining districts, or are engaged in hardwood manufactures, and (3) the county towns, severally contributed more than three-quarters of a million to the increase; the increase of the people living in watering-places was 200,164. In the latter class the rate of increase was the smallest; Stockton in 1811, 25 per cent. annually. The annual rate of increase was 8,338 in the manufacturing towns, 2,336 in the mining and hardware towns, 2,191 in the sea-ports, 1,850 in London, and 1,089 in the county towns. The annual rate of increase in Great Britain during the period was 1,377. They have increased more rapidly in that which straw-plait, cotton, pottery, and iron are manufactured."

The density and proximity of the population are elucidated in the Report of the Commissioners in the Summary Tables in various ways, and at considerable length; here, however, we shall content ourselves in the 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 abstracts of the population of the districts of England and Wales, from 155,751 persons on a 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 Highest is its suburbs, which is 61,858 on a square mile. Manchester has 11,577, which is less than Leeds, which has 30,886; Bristol, which has 22,838; Plymouth, which has 20,441; Nottingham, which has 19,984; East Stonehouse, which has 19,015; Brighton, which has 18,088; Hull, which has 17,575; Sunderland, which has 11,507; Greenwich, which has 11,849; and Exeter, which has 11,617. The smaller density of Manchester than such towns as Salisbury and Exeter is accounted for, in a great measure, by the large number of factories and warehouses, the result is scarcely what 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 overcrowding in the large towns is manifest; where they are compared with some of the other most populous manufacturing towns: Sheffield, for instance, which is among the densest, has 6,663, or little more than half as many on a square mile as Salisbury. Bradford, which has 2,857, or less than one-fourth, and a third of which has 1,355, 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 asunder; the mean distance was 106 yards asunder; the mean distance apart of the houses in 1801 being 362 yards, and 552 yards in 1811. Or, as it may be otherwise expressed, on the same area the population has doubled; the proximity has increased—the separation diminished. In the case of the small towns the proximity the mean the population increased from 918,635 to 14 yards in 1815. The Islands of the British Seas are noticed more fully in their respective Volumes than by previous Census. Five hundred islands and rocks have been described as follows:—Anglesley 57,316, Jersey 57,070, Isle of Man 63,344, Isle of Wight 50,284. Four others have each above Q
20,000 — Guernsey 29,757, Lewis 28,918, Skye 21,359, and Shetland 20,936. Two more number upwards of 10,000 — Orkney 16,665, and Islay 12,324. Twenty number between 1,000 and 10,000 inhabitants; fifteen between 500 and 1,000; three between a and 500; three between 100 and 500; forty-five between 10 and 60; seven number 10 inhabitants on each; and twenty-five under 10, two of them having only one inhabitant on each. Little Paps, one of the Shetlands, a woman, and Inshcolin, in Fifeashire, a man. Some of the small and smaller islands are 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 46 males and 62 females. In Ulster there were born, except one female, aged 35, who was imported from Sutherlandshire. The excess of females is chiefly among children under 20, of whom there were 22 males and 30 females; and persons above 60, of whom 6 are females and 1 is only 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 as is called the "eight days' illness," several were born during the previous twelve months, but only two were living. There is 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 organization according to the Municipal Reform Act was 717; of which there were 4,245,269 in 1831, of which 18 have had charters of incorporation granted since the passing of that Act. There are 89 unrepresented boroughs. Of the reform districts boroughs it is found that one-half of the population (2,820,543) is contained in 17 boroughs, each of which contains more than 60,000 inhabitants. It appears also that 102 boroughs, or more than half of the total number, contain less than 9,000 inhabitants in each; in the aggregate, 472,551 inhabitants. Eighty-seven boroughs have from 2,000 to 7,000 inhabitants; twenty-seven, from 300 to 4,000; eight, from 400 to 6,000; seven, from 600 to 800; two, from 800 to 1,000; and three have 200 and upwards.

The 83 royal and municipal boroughs of Scotland contained 729,777 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 organization. Among these are the metropolitan parliamentary boroughs of the Tower Hamlets, population 539,111; Finsbury, 323,722; Marylebone, 370,557; Greenwich, 106,786; Lambeth, 251,345; and Westminster, 241,011; and the towns of Brighton, population, 69,673; Burnley, 20,809; Bury, 31,262; Chatham, 28,424; Cheltenham, 35,051; Dudley, 37,802; Huddersfield, 30,880; Merthyr Tydfil, 63,080; Rochdale, 29,168; Salford, 36,396; Wigan, 32,150; and Wrexham, 24,853. In Scotland there are not 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 various Parish (p. 32) as exhibited in the Census returns.

With respect to Ireland, the circumstance 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 1841 showed that during the past ten years the gain of the previous twenty had been more than undone. In 1821 the total population of Ireland was 6,601,827; in 1831 it was only 6,551,970. And the returns further showed that this decrease was not confined to any one single county, but as compared with 1821, 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 1861 was mainly owing to the disastrous 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 1,389,133, "varying with considerable regularity according to the variations in the state of the labouring classes." For the purpose of presenting 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 1831 to 1851.

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Acres</th>
<th>1831</th>
<th>1851</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leinster</td>
<td>4,076,211</td>
<td>1,727,482</td>
<td>1,096,713</td>
</tr>
<tr>
<td>Munster</td>
<td>6,054,799</td>
<td>2,535,611</td>
<td>1,222,152</td>
</tr>
<tr>
<td>Ulster</td>
<td>4,875,438</td>
<td>1,338,494</td>
<td>2,286,623</td>
</tr>
<tr>
<td>Connacht</td>
<td>4,925,109</td>
<td>1,110,229</td>
<td>1,349,514</td>
</tr>
<tr>
<td>Total of Ireland</td>
<td>20,808,271</td>
<td>7,601,807</td>
<td>7,767,401</td>
</tr>
</tbody>
</table>

The decrease 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 showing 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 1831 contained 185,881 inhabitants, had 258,788 in 1841, and 296,361 in 1851. Cork, though it showed a decline of nearly 15,000 between 1821 and 1851, showed an increase of above a thousand from 1841. Belfast had more than doubled in population between 1821 and 1851, and between 1851 and 1861 had increased from 75,308 to 100,300. Galway town, which between 1831 and 1841 had fallen in population from 33,190 to 17,975 had increased in 1851 to 23,665.

The two following tables will show in the readiest manner the general results of the enumeration of 1851.

| Area, Houses, and Population, on March 31st, 1851. |
|-----|-----|-----|-----|
| Great Britain and the British Seas | 57,924,577 | 3,670,122 | 166,753 | 29,194 |
| England and Wales | 37,324,915 | 3,275,039 | 153,494 | 26,751 |
| Scotland | 20,047,662 | 370,308 | 12,146 | 2,429 |
| Islands in the British Seas | 292,900 | 21,945 | 1,005 | 203 |

Total | 20,057,497 | 3,275,039 | 153,494 | 26,751 |

The decrease of population 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 showing 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.
### Population of Towns

<table>
<thead>
<tr>
<th>Counties</th>
<th>Number.</th>
<th>Population of Towns</th>
<th>Population of Villages and Detached Dwellings of the Country</th>
<th>Area In Acres of Towns</th>
<th>Area in Acres of the Country surrounding the Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>52</td>
<td>880</td>
<td>8,990,809</td>
<td>8,936,800</td>
<td>1,724,406</td>
</tr>
<tr>
<td>Scotland</td>
<td>32</td>
<td>225</td>
<td>1,497,079</td>
<td>1,391,663</td>
<td>263,134</td>
</tr>
<tr>
<td>Channel Islands</td>
<td>3</td>
<td>10</td>
<td>68,400</td>
<td>74,726</td>
<td>15,109</td>
</tr>
</tbody>
</table>
| Great Britain and Islands in Brit.

### In the article Great Britain of the 'Penny Cyclopædia' 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 1831, and under the head Ireland a similar table is given for that island. In the former Supplement, under the head Census, tables are given of 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.

## Counties

<table>
<thead>
<tr>
<th>Counties</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedfordshire</td>
<td>295,592</td>
<td>124,478</td>
</tr>
<tr>
<td>Berkshire</td>
<td>450,358</td>
<td>159,065</td>
</tr>
<tr>
<td>Buckinghamshire</td>
<td>450,940</td>
<td>156,542</td>
</tr>
<tr>
<td>Cambridgeshire</td>
<td>553,681</td>
<td>185,495</td>
</tr>
<tr>
<td>Cheshire</td>
<td>707,078</td>
<td>455,725</td>
</tr>
<tr>
<td>Cornwall</td>
<td>573,600</td>
<td>555,558</td>
</tr>
<tr>
<td>Cumberland</td>
<td>1,001,273</td>
<td>405,759</td>
</tr>
<tr>
<td>Derbyshire</td>
<td>656,603</td>
<td>250,644</td>
</tr>
<tr>
<td>Devonshire</td>
<td>1,557,140</td>
<td>567,098</td>
</tr>
<tr>
<td>Dorsetshire</td>
<td>632,025</td>
<td>184,007</td>
</tr>
<tr>
<td>Durham</td>
<td>622,474</td>
<td>290,097</td>
</tr>
<tr>
<td>Essex</td>
<td>1,060,549</td>
<td>369,818</td>
</tr>
<tr>
<td>Gloucestershire</td>
<td>805,102</td>
<td>458,905</td>
</tr>
<tr>
<td>Hampshire</td>
<td>1,092,405</td>
<td>415,973</td>
</tr>
<tr>
<td>Herefordshire</td>
<td>543,823</td>
<td>115,449</td>
</tr>
<tr>
<td>Hertfordshire</td>
<td>391,141</td>
<td>167,298</td>
</tr>
<tr>
<td>Huntingdonshire</td>
<td>230,065</td>
<td>64,163</td>
</tr>
<tr>
<td>Kent</td>
<td>1,010,670</td>
<td>616,796</td>
</tr>
<tr>
<td>Lancashire</td>
<td>1,219,221</td>
<td>803,296</td>
</tr>
<tr>
<td>Leicester</td>
<td>514,164</td>
<td>230,308</td>
</tr>
<tr>
<td>Lincolnshire</td>
<td>1,775,720</td>
<td>997,222</td>
</tr>
<tr>
<td>Middlesex</td>
<td>109,168</td>
<td>284,976</td>
</tr>
<tr>
<td>Monmouthshire</td>
<td>368,339</td>
<td>157,418</td>
</tr>
<tr>
<td>Norfolk</td>
<td>1,354,301</td>
<td>442,714</td>
</tr>
<tr>
<td>Northamptonshire</td>
<td>630,538</td>
<td>212,300</td>
</tr>
<tr>
<td>Northumberland</td>
<td>1,249,299</td>
<td>303,658</td>
</tr>
<tr>
<td>Nottinghamshire</td>
<td>526,076</td>
<td>210,427</td>
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<tr>
<td>Oxfordshire</td>
<td>472,887</td>
<td>170,493</td>
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<tr>
<td>Rutlandshire</td>
<td>95,805</td>
<td>22,983</td>
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<tr>
<td>Shropshire</td>
<td>826,055</td>
<td>229,341</td>
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<tr>
<td>Somersetshire</td>
<td>1,047,220</td>
<td>443,916</td>
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<tr>
<td>Staffordshire</td>
<td>728,468</td>
<td>608,716</td>
</tr>
<tr>
<td>Suffolk</td>
<td>947,681</td>
<td>337,215</td>
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<tr>
<td>Surrey</td>
<td>475,792</td>
<td>823,002</td>
</tr>
<tr>
<td>Sussex</td>
<td>934,831</td>
<td>386,044</td>
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<tr>
<td>Warwickshire</td>
<td>561,416</td>
<td>471,855</td>
</tr>
<tr>
<td>Westmorecastle</td>
<td>485,432</td>
<td>83,097</td>
</tr>
<tr>
<td>Wigton</td>
<td>865,092</td>
<td>254,231</td>
</tr>
<tr>
<td>Worcester</td>
<td>472,164</td>
<td>276,206</td>
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<tr>
<td>Yorkshire, East Riding</td>
<td>769,419</td>
<td>298,983</td>
</tr>
<tr>
<td>York, City</td>
<td>2,720</td>
<td>36,303</td>
</tr>
<tr>
<td>Yorkshire, North Riding</td>
<td>1,350,121</td>
<td>215,214</td>
</tr>
<tr>
<td>Yorkshire, West Riding</td>
<td>1,709,026</td>
<td>335,045</td>
</tr>
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</table>

## WALES

<table>
<thead>
<tr>
<th>Counties</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglesey</td>
<td>188,403</td>
<td>57,927</td>
</tr>
<tr>
<td>Brecknock</td>
<td>460,188</td>
<td>61,474</td>
</tr>
<tr>
<td>Cardiganshire</td>
<td>443,387</td>
<td>70,769</td>
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<tr>
<td>Caernarvonshire</td>
<td>606,311</td>
<td>110,629</td>
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<tr>
<td>Caernarvon (continued)</td>
<td>725,072</td>
<td>87,209</td>
</tr>
<tr>
<td>Denbighshire</td>
<td>316,052</td>
<td>92,853</td>
</tr>
<tr>
<td>Flintshire</td>
<td>14,605</td>
<td>86,156</td>
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<tr>
<td>Glamorgan</td>
<td>347,494</td>
<td>251,849</td>
</tr>
<tr>
<td>Merionethshire</td>
<td>325,961</td>
<td>226,688</td>
</tr>
</tbody>
</table>

## SCOTLAND

- Aberdeen: 1,266,625
- Argyleshire: 2,083,126
- Ayrshire: 659,166
- Banffshire: 439,219
- Berwickshire: 459,375
- Bute: 147,216
- Caithness: 465,508
- Clashmarnannshire: 29,749
- Dumfriesshire: 189,444
- Dumfriesshire: 273,030
- Edinburghshire: 254,300
- Elgin: 398,104
- Edinburghshire: 332,659
- Fife: 521,119
- Forfars: 367,119
- Haddingtonshire: 155,937
- Inverness-shire: 2,723,391
- Kinross-shire: 222,240
- Kirkcudbrightshire: 610,742
- Lanarkshire: 631,719
- Linlithgowshire: 367,248
- Nairnshire: 137,582
- Orkney and Shetland: 988,873
- Peeblesshire: 226,408
- Perthshire: 1,814,063
- Renfrewshire: 150,900
- Ross and Cromarty: 2,016,375
- Roxburghshire: 493,999
- Selkirkshire: 170,313
- Stirling: 295,875
- Sutherlandshire: 1,307,186
- Wigtownshire: 926,336

## IRELAND

- Leinster: 221,342
- Dublin: 222,714
- Cork: 250,700
- Kilkire: 418,436
- Kilkenny: 508,811
- Kilkenny (city): 921
- King's County: 458,855
- Longford: 269,409
- Louth: 210,484
- Drogheda: 472
- Meath: 579,374
- Queen's County: 424,834
- Westmeath: 458,488
- Westmeath: 156,359
- Wicklow: 500,173

## Munster: 827,594
- Clare: 212,428
- Cork: 1,823,500
- Cork city: 2,893
- Kerry: 1,186,126
- Limerick: 676,224
- Limerick (city): 1,190
- Tipperary: 1,070,731
- Waterford: 460,894
- Waterford city: 669

- Ulster: 743,581
- Antrim: 251,881
- Belfast: 1,572
- Carlow: 16,709
- Cavan: 195

<table>
<thead>
<tr>
<th>Counties</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent</td>
<td>263</td>
<td>85,745</td>
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<tr>
<td>Leinster</td>
<td>1,816,126</td>
<td>238,539</td>
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<tr>
<td>Limerick</td>
<td>928,224</td>
<td>208,688</td>
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<tr>
<td>Meath</td>
<td>493</td>
<td>190,447</td>
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<tr>
<td>Queen's County</td>
<td>1,070,731</td>
<td>331,467</td>
</tr>
<tr>
<td>Waterford</td>
<td>460,894</td>
<td>128,734</td>
</tr>
<tr>
<td>Waterford city</td>
<td>669</td>
<td>25,507</td>
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</tbody>
</table>

### Q2
In the following list, the towns generally contain a population of 2000 and upwards, but several are also inserted which have a smaller population. The Parliamentary Boundaries placed first; then follows the list of the towns, including the parliamentary boroughs, which are in many instances also Municipal Boroughs, having a population different from that of the Parliamentary Boroughs. The 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.

**ENGLAND.**

**BEDFORDSHIRE.**

Bedford, P.B. 11,693

**Berkshire.**

Abingdon, P.B. 3554

Reading, P.B. 21,435

Wallington, P.B. 8064

Windsor, P.B. 5596

Abingdon, M.B. 5594

Farringdon, Great 2456

Hungerford 2255

Lacock 1258

Maidenhead, M.B. 3807

Newbury, M.B. 6574

Reading, M.B. 21,456

Wallington, M.B. 8191

Windsor, M.B. 3596

Wokingham 2272

Buckinghamshire.

Avonmouth, P.B. 26,794

Buckingham, P.B. 8069

Marlow, Great, P.B. 6523

**C AMBRIDGE SHIRE.**

Cambridge, M.B. 27,815

Cambridge University, P.B.

Cambridge, P.B. 27,815

Ely 6176

Linton 2061

Woolton 2633

Schaum 276

Thorpe 2174

Upwell 2061

Whalley 1872

Wisbeach, M.B. 10,594

Cheshire.

Chester, P.B. 27,766

**D E V O N S H I R E.**

Amberley, P.B. 3423

Barnstaple, P.B. 11,877

Bideford, M.B. 5173

Bodmin, M.B. 2257

Callington 2763

Crediton 3934

Dartmouth, M.B. 4988

Dawlish 2671

Exeter, M.B. 32,018

Fowey 1323

Honiton, M.B. 3427

Hussocke 2919

South Molton, M.B. 4425

Tiverton, M.B. 11,144

Topsham 2717

**D O R S T E R S H I R E.**

Bridgewater, P.B. 7666

Dorchester, P.B. 6394

Lyme Regis, P.B. 3516

Poole, P.B. 9254

Blandford, M.B. 2599

Bridport, M.B. 2599

Lyme Regis, M.B. 3250

Weymouth and Melcombe Regis, P.B. 4958

Bembridge 2085

Blandford, M.B. 2599

Bridport, M.B. 2599

Lyme Regis, M.B. 3250

Weymouth and Melcombe Regis, P.B. 4958

Auguyne, P.B. 2905

Brampton 3074

Cambridge, M.B. 26,310

Cockermouth 3959

Darlington 11,228

Dartmouth, M.B. 4988

Derby, M.B. 2227

Dursley 2692

Eastbourne 5640

Epsom 1875

Essex.

Barking 4750

Brentwood 2195

Chelmsford 6023

Colchester 10,443

Colne 3494

Colchester, M.B. 10,443

Colchester, M.B. 10,443

Epping 1873

Hornchurch 2698

Harwich 4451

Dovercourt, M.B. 2974

Walden, M.B. 4558

Scarborough 5911

Stratford 10,586

Walsall 4169

Aberdare 2799

Barnstaple, M.B. 11,877

Bideford, M.B. 5173

Bodmin, M.B. 2257

Callington 2763

Crediton 3934

Dartmouth, M.B. 4988

Dawlish 2671

Exeter, M.B. 32,018

Fowey 1323

Honiton, M.B. 3427

Hussocke 2919

South Molton, M.B. 4425

Tiverton, M.B. 11,144

Topsham 2717

Bembridge 2085

Blandford, M.B. 2599

Bridport, M.B. 2599

Lyme Regis, M.B. 3250

Weymouth and Melcombe Regis, P.B. 4958

Auguyne, P.B. 2905

Brampton 3074

Cambridge, M.B. 26,310

Cockermouth 3959

Darlington 11,228

Dartmouth, M.B. 4988

Derby, M.B. 2227

Dursley 2692

Eastbourne 5640

Epsom 1875

Barking 4750

Brentwood 2195

Chelmsford 6023

Colchester 10,443

Colne 3494

Colchester, M.B. 10,443

Epping 1873

Harwich 4451

Dovercourt, M.B. 2974

Walden, M.B. 4558

Scarborough 5911

Stratford 10,586

Walsall 4169

Aberdare 2799
<table>
<thead>
<tr>
<th>CEN</th>
<th>117</th>
<th>CEN</th>
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<tbody>
<tr>
<td>GLOUCESTERSHIRE</td>
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<tr>
<td>Bristn, P. B.</td>
<td>137,328</td>
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<tr>
<td>Cheltenham, P. B.</td>
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<tr>
<td>Chesterton, P. B.</td>
<td>69,069</td>
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<tr>
<td>Gloucester, P. B.</td>
<td>13,613</td>
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<tr>
<td>Swindon, P. B.</td>
<td>36,535</td>
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</tr>
<tr>
<td>Tewkesbury, P. B.</td>
<td>5878</td>
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</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Oxford, P. B.</td>
<td>497</td>
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</tr>
<tr>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| HAMPSHIRE | | |
| AWE, P. B. | 5395 | | |
| Chandlers Ford, P. B. | 7475 | | |
| Lymington, P. B. | 3929 | | |
| Newport, P. B. | 8047 | | |
| Petersfield, P. B. | 5550 | | |
| Petersfield, P. B. | 72,096 | | |
| Winchester, P. B. | 15,704 | | |
| | | | |

| HERTFORDSHIRE | | |
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| | | | |
| | | | |
| | | | |

| LANCASTERSHIRE | | |
| ASPTON-UPON-LEENE, P. B. | 29,791 | | |
| BLACKBURN, P. B. | 46,539 | | |
| Bolton, P. B. | 61,171 | | |
| Bury, P. B. | 31,262 | | |
| Clitheroe, P. B. | 11,848 | | |
| Lancaster, P. B. | 16,168 | | |
| Liverpool, P. B. | 375,955 | | |
| MANCHESTER, P. B. | 513,215 | | |
| Preston, P. B. | 72,558 | | |
| Wigan, P. B. | 2,188 | | |
| Wigan, P. B. | 31,941 | | |
| | | | |

| LONDON | | |
| | | | |

| MIDDLESEX | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| NORFOLK | | |
| | | | |

| SHROPSHIRE | | |
| BROMSGROVE, P. B. | 18,938 | | |
| Colchester, P. B. | 28,424 | | |
IRELAND.

Parliamentary Boroughs.

Armagh 8562  6904
Athlone 8914  34,146
Bandon 7942  24,182
Belfast 78,354  5585
Carlow 11,575  68,681
Carrickfergus 8520  6973
Cashel 9069  19,973
Clonmel 18,204  5988
Coleraine 6317  10,146
Cork 114,232  14,754
Drogheda 19,929  2964
Dublin 265,252  15,759
Dundalk 10,233  32,604
Dungannon 3854  12,673
Dungarvan 11,526  9653
Ennis 10,519

Cities and Towns.

ANTRIM.

Antrim 2325  2997
Ballycastle 1659  8372
Ballymena 6136  2212
Ballymoney 2934  5864
Belfast 100,300  3192
Carrickfergus 3543  4583
Larne 3076  3717
Limavady 1659  3439
Lisburn 6569  3608
Whitehead 2256

ARMAGH.

Armagh 8578  4910
Lurgan 4205  7630
Portadown 3091

CARLOW.

Bagenalstown 2292  4032
Carlow 11,587  1582
Tullow 2966  2301

CAYAN.

Belurbet 1054  2841
Cavan 3034  2671
Cootshill 2105

CLARE.

Ennis 7843  1741
Ennistimon 1818  1806
Killaloe 4471  2125

CORK.

Bandon 7942  2212
Bantry 2943  2301
Charleville 2692

COUNTRYS.

Dublin 2029  2384
Dundalk 16,947  8146

CENTRAL.

Ballina 5985  2106
Ballinrobe 1647
Clifden 2468
Clare 1569

SUTHERLANDSHIRE.

Dornoch, C.R.B. 599
Dornoch, M.B. 599

WIGTONSHIRE.

Stranraer, C.P.B. 2599  2337
Wigtown, C.P.B. 2121  1806

Newton Stewart 2599  2600
Stranraer, M.B. 2077

ISLANDS IN THE BRITISH SEAS.

ISLE OF MAN.

Castletown 2479  29,133
Douglas 9880  2997
Port 2342  2997
Ramsay 2701

GUERNSEY.

St. Peter Port (T. and P.) 16,778

JERSEY.

St. Helier (Town and Parish) 25,133

KILDARE.

Athy 8877  1275
Kildare 1275  1275
Maynooth 1396  1396
Ness 5010

KILKENNY.

Cahir 2351  1937
Castlecomer 1694  1451
Grange 1710  53,449
Kilbride 19,973  2719
Kilkenny 1728  2988

KING'S COUNTY.

Ballybrophy 1846  1846
Birr (Parsonstown) 5489  5489
Tullamore 4630  4630

LEITRIM.

Ballinamore 1244  1244
Manchonamilton 1230  1230
Mohill 1217

LIMERICK.

Askeaton 1937  1937
Ballycasey 1451  1451
Limerick 53,449  53,449
Newcastle 2719  2719
Rathkeale 2988  2988

LONGDERRY.

Ballymena 6292  6292
Longderry 20,187  20,187
Magherafelt 1390  1390
Newtownmartin 3520

LONGFORD.

Granard 1803  1803
Longford 8278  8278

LOUTH.

Ardee 2729  2729
Dundalk 15,947  15,947
Duleek 9642  9642

MAYO.

Ballina 5985  5985
Ballimore 2106  2106
Clifden 2468  2468
Clare 1569  1569

MOUNT.

Kells 3600  3600
Navan 3975
Trim 1985

MONAGHAN.

Ballybay 1617  1617
Carlowbarry 5049  5049
Castleblaney 2071  2071
Clones 2319  2319
Monaghan 3338

QUEEN'S COUNTY.

Maryborough 2078
Mountmellick 3597  3597
Portarlington 2730

ROSCOMMON.

Boyle 2757
Roscommon 3086

SLIGO.

Sligo 11,041

TIPPERARY.

Cashel 3694  3694
Castletown-co-suir 6192
Cashel 4789
Clonmel 15,204  15,204
Creagh 2174
Neahg 7349
Roscrea 3349
Templemore 4372
Tipperary

TYRONE.

Cookstown 2993
Dungannon 3835
Enniskillen 3034
Strabane 4265

WATERFORD.

Cappoquin 2144
Carrickabraghy 2108
Dungarvan 6865
Lismore 2319
Portlaw 4352
Tallow 1896
Tramore 1852
Waterford 26,397

WESTMEATH.

Athlone 6198
Edenderry

WEXFORD.

Enniscorthy 6010
Gorey 2972
New Ross 7965
Wexford 15,471

WICKLOW.

Arklow 3300
Balbriggan 2100
Balbriggan 2100

CENTROUS (Illiger), a genus of birds belonging to the order Anseriformes. The species are natives of India and New Guinea. They have a long pointed beak, like the more common ducklings and storks. Their plumage is rigid and spinous. They build their nests in the holes of trees, and lay white eggs. They feed chiefly on grasshoppers, and dwet amongst roots and other herbage, and do not often take to water. Their flesh is not pleasant eating.

CERADIA, a genus of plants belonging to the Compositae family of the order Compositae. C. furcata is a half-succulent plant, inhabiting the most sterile regions of Africa. It yields a soapy substance, which gives off a fragrant odour when burnt, and has been called African Balsam; it is

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however a very different thing from the true Bellidium.

**BELLIDIIUM**

**CEREBUS** a genus of plants belonging to the natural order Cereales.

It is characterized by its sepals being very numerous, imbricate, adnate to the base of the ovary, united into an elongated tube, outer ones shorter and like a calyx, middle ones longer and coloured, innermost ones petaloid; the receptacle is globular or oblong, tuberous, or oval from the remains of the sepals. The species are feebly grotesque shrubs, with a woody axis and soft interior. They possess angles which are vertical and covered with bodies of spines. The flowers are large, arising from the angle to the base of the leaf. The Old Man Torch-Thistle, *C. emilii*, is an erect plant, bearing a stem with 25-35 vertical ribs, covered with fascicles of bristles, each fascicle containing from 15-20 radiating bossed-curved bristles. Its long grey bristles give it the appearance of the head of an old grey-haired man. It is a native of Mexico.

**C. flagelliformis,** the Creeping Cereus, has prostrate stems with about 10 angles. It is very common in our gardens, and its trailing stems require the support of trellis-work. It bears an abundance of beautiful red and pink flowers. It is a native of South America, though now naturalised in Asia and Africa.

**C. grandiflorum**, the Night-Flowering Cereus, has naked stems with 5 or 6 angles and fascicles of bifi-tips, with the ribs such fascicles. It is a native of the West Indies, 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 also very fragrant, and flower most of the time from April to November, and last for three or six hours. They generally begin to open between seven and eight o'clock in the evening, and are fully expanded by eleven or twelve, and before the next morning they are quite faded.

**C. goniocarpa** is an erect plant, 3 or 4 angled, the angles toothed, the prickles subulate, straight, rising from a white tomentum. It is a native of Mexico, but is very commonly cultivated in our gardens, on account of its large flowers, which are of a beautiful scarlet, the inner petals having a triquetrical character, was called the 'Bluebell of the Desert'. The various species of plants have been described, and a fine collection of them exists in the Royal Gardens at Kew. They are of easy culture, and require the same general treatment as the order to which they belong. [Cactus].

**CERES ABBAS.** [Douglasiana.]

**CERNA,** a genus of fishes belonging to the section Lanthidermidae and the family Percida. It includes the Ruff or Pope, a British fish, which has also been named *Lanthiderma Lanthina.* The arrows of *Lanthiderma Ctenosoma,* as given by Yarrell in his 'British Fishes,' is as follows:--'Dorsal fin single, elongated, the rays of the fin portion spines, the others flexible; branchiostegous rays seven; teeth very small, uniform, numerous; head without a single jaw tooth to the pre-operculum indented; spiracle ending in a single point.'

In *Acronia vulgaris,* the Ruff or Pope, the prevailing color of the upper part of the body and head is a light slate-brown, passing into a yellowish-brown on the sides, and becoming almost silvery-white on the belly. The lateral line prominently and strongly marked. Small brown spots are disseminated over the back, dorsal fin, and tail, assuming on the latter, from their arrangement, the appearance of bars; prismatic, central, and anal fins, pale-brown. This fish is an inhabitant of fresh waters, and closely allied to the perch. It was first described by Dr. Caius, who named it *Apsara,* being a translation of our word 'Ruff' (rough), which is applied to this fish by account of the hair-like texture of its denuded scales. It is found in all the rivers of England, specially the Thames, the Isis, and Cam, and is found in the colder parts of the European continent. It is like the perch in its habits. (Yarrell, *British Fishes.*)

**CERES BONNORUM.**

The proceedings of the trustees in *Ceres* have been subjected to the control of the Court, and its bankrupt, in Bankruptcy, in the same way as those of Bankruptcy. When a bankrupt's assets do not exceed 100L, he is entitled only to the advantages of the judgment in a *Cessio* (10 & 20 Vict. c. 79).**

**CHALCEDON.** [Astrak.]

**CHALCIS,** the ancient name of the town of Erypous.

**CERDAZ.**

**CHALK FORMATION.** [Cretaceous Group.]

**CHALMERS,** the REV. DR. THOMAS, was born at Anstruther, in Fife, on the 23rd of March 1670. He was the sixth child of a family of fourteen, born to Mr. John Chalmers, a dyer, shipowner, and general merchant in Anstruther, by his wife Elizabeth Hall. Educated first at the parish school of Anstruther, and next at the University of St. Andrews, he was early distinguished as an uncommon reader—less however in the formal business of the classes, than in his general intercourse with his fellow-students. Having chosen the clerical profession, and gone through the usual theological studies at St. Andrews, he obtained, with much ease, a licence in 1707 to preach. This licence was purchased by him in Edinburgh, where he occupied himself in teaching, and also in attaining the classes of Dugald Stewart, Robison, Playfair, and Hope, then in the height of their fame. It was at this time that his passion for mathematical and natural philosophy, as an additional study, acquired an original speculation on moral and social subjects, first conspicuously revealed themselves. After a period of desultory occupation, first as assistant to the clergyman of Carsers in Roxburghshire, and then as assistant to the mathematical professor of St. Andrews, he was admitted to the benefice of Kilmany, in his native county of Fife; into which parish he was inducted on the 12th of May 1803. He was then twenty-three years of age, and he continued in the position of a minister and professor of mathematics at Kilmany until 1815. These twelve years formed a very eventful period in his mental history. On adopting the clerical profession he had brought into it no very decided views in doctrinal theology. He was attached to what was called the 'Moderate,' as distinct from what was called the 'Reformed.' The Moderate was called the 'Younger Scotch,' and the Reformed was called the 'Older Scotch.' 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, 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 chief reference at this time was to the *Planetary Tables,* the one of grandeur of the world, 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 chance of success he offered himself in the following year as a candidate for the mathematical chair in Edinburgh. The mathematical chair in Edinburgh, which was created in 1696, and to which Playfair was appointed, and which was held by 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 habits" 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 "cruel and libellous inscription"—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 being considered a result of 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. Circumstances preceding him from realising 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. He made his last speech in the General Assembly of the Scottish Church in the last 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 solemnising
effects of a severe illness which, during the winter of 1803-4 bore him so heavily, that extraordinary powers attributed the great moral and spiritual effect of his life. Then, for the first time, as he thought, he saw Christianity in its true light; and then for the first time also was he of the duties of the clerical office, as he thought, sufficiently deepened to enable him to perform them. It is now generally true that we have a clearer idea of this, whereas hitherto he had belonged to the 'Moderate' party in the Scotch Church than in the majority, he now ranked with the 'Evangelical' party, which formed but a minority. But the fruits of the change were more immediately visible in his own conduct, and in the communings of his mind. It was generally observed that in all that Mr. Chalmers did the influence of a deep sense of religion, and a conviction of the paramount claims of Christ upon the thoughts of men, were discernible. Always eloquent in the pulpit, his eloquence now burst forth in strains of such passion and fervour as 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, he now supported with increased zeal. In the spirit of his new principles he transferred instead of confining his ministerial studies to his weekly 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 and needs; and this spirit was in him 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 1813, on his return from a tour in the Southern United States, appeared in the 'Edinburgh Encyclopedia,' 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 industrious parochial work, in theological study, and in the composition of miscellaneous 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 parish to assume the pastoral care of Tron parish in the city of Glasgow. He remained in Glasgow all the years. In 1816 the degree of D.D. was conferred on him by the University of Glasgow. From 1815 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 formed the period of his highest celebrity as a pulpit orator. In this city he达到了 the highest pitch of his pulpit oratorical power; and on his occasional visits to Edinburgh, London, and other places, his name as an orator preceded him, and drew crowds to hear him at. At Edinburgh his oratory was exhibited not only in the pulpit, but also in the debate, where he was bold and active in the discussion of the political questions of the day, and his oratory was a formidable and irresistible weapon. His speeches, like his sermons, were generally read; and very rarely indeed did he speak extemporaneously. With all his extraordinary popularity as an orator, however, no man appreciated his Doctrinal Sermons upon the Church and the Christian Orator,
S. Andrews and in the neighbourhood 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 co-operating force on the "Evangelical side" of all the great sessions, and where, from the very commencement, and for the whole tenor of his future career, was not carried out. The literary results of his five years' sojourn at St. Andrews were the volumes of "Lectures on Moral Philosophy," and "Political Economy," prepared for his class and reserved for publication; the "Liberties and Grievances of Toros," published in 1826; and a treatise on "Ecclesiastical and Literary Endowments," published in 1837.

Dr. Chalmers' next appointment was to the chair of Divinity in the University of Edinburgh. The duties of this office he assumed in 1828, and he discharged them during fifteen years—i. e. from 1828 to 1843, or from his forty-ninth to his sixty-third year. His activity during these fifteen extraordinary years of his life (not taking account of his occasional sermons) was made up of three distinct kinds of work—his duties as theological professor; his continued exercises in literature, speculation, and schemes of Christian philanthropy; and his controversial energy in connection with the ecclesiastical struggle which during that time agitated Scotland.

1. His Moral or "Political" Professor. —In this important capacity, which involved the theological instruction and training of between one and two hundred young men annually for the Scottish Church, Dr. Chalmers exerted a remarkable influence. In the new church he saw himself as a man of noble purpose and burning enthusiasm, with whom no young man could come in contact without love and reverence, and who was in the habit not only of communicating massive thoughts of his own on almost all subjects, his ideas of stirring up thought among others; but who was truly a centre of life and intellectual influence; and those who went forth from it carried with them the performance of his spirit and many of his views.

2. His independent labourers. —Churchmen, in whatever capacity, whether it is possible to take full account; suffice it to say that in 1831 he published his treatise on "Political Economy," and in 1833 his Bridgewater treatise on "The Adaptation of External Nature to the Moral and Intellectual Constitution of Man," that in 1838 he delivered in London, and afterwards published, a series of "Lectures in Defence of Church Establishments." That in the following year he made a tour through Scotland to advocate the cause of church extension; that in 1840 he published his book on "The Church and the Parochial System Without a Poor-Rate for the Right Management of the Poor," that during the same period he delivered, during the summer vacations various lectures to popular audiences on topics of natural science; and that he gave some sign of his daughters, one of whom married a man under whose superintendence a new issue of the collected works of Dr. Chalmers has 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 as an orator, that he always spoke not only in a broad Scottish, but also in a broad provincial accent, which is almost every word. Personally he was a man of most simple, bland, and sociable manners, with a great fund of anecdote and broad humour. His works, notwithstanding the force of intellect that they show (and his speculations in social and political economy, in particular, are used 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 alive, and of what he still is in the mind. It is therefore found that they are printed in small volumes, and that the whole tenor of his life was expressed, in the words of his friend, "of healing the breach which had been made, and restoring quiet to Scotland; but at last, these hopes being over, the struggle was ended at the meeting of the General Assembly on the 18th of May 1848, 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' 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 young men (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 organisation and raising funds for the new church, and even, probably at no period of his life was the statesman-like character 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 much to his mind, and was about to complete the work of completing its organisation 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 charity in connexion with the life of the Free Church, with 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 old town of Edinburgh, when death removed him. He had just returned from a visit to England in apparently 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 at his lodgings at Margaret Street, near Edinburgh. His death was felt throughout Scotland like a national calamity; and all ranks and parties joined in doing honour to his memory as one of the greatest men that Scotland had produced. He left a widow who did not survive long, and six children, four of whom married, one of whom married under whose superintendence a new issue of the collected works of Dr. Chalmers has been put forth in twenty-five volumes, and who has also written his life in four volumes, and edited much of his correspondence.
them. They have the fragrance of Myrrhstone. Fifteen genera and fifty species are included in this order, all natives of Australia. Their position, according to Lindley, is between Astrangies and Myrtaceae, near to Myrtaceous. (Lindley, Vegetable Kingdom.)

CHANCERY, COURT OF. There are now three Vice-Chancellors (6 Vict. c. 5; 15 Vict. c. 4), before whom and the Master of the Rolls all suits in this Court are originally heard. The Court consists of two justices, one of whom is the Master of the Rolls, and the other a justice of the court, the justices being agreed to by the Lord Chancellor and the Chief Justice of England. The master is appointed in council from among the whole delay which has always been the standing reproach of this Court was thought to rest, have been abolished, their functions being now performed by the Master of the Rolls and by the joint solicitors of the court.

CHAUDINNE, Chaotic Plants, a family invented by Bory, for the purpose of placing a number of the lower forms of plants or organic beings of uncertain character, which could not be placed among other families or groups of Cryptogamia. To this family were at one time assigned forms of Distotinae, Desmidoth, Nostoc, and others.

CHAR, or CHARR, one of the British species of the genus Salmo, of the Salmon tribe (Salmo salarines)...

CHARITIES. [Usas, S. 2; Tawne, 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 report upon 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 unless the inspector has reported without the consent of the Persons responsible for this 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 under 30l., the County Court of the district, or the County 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. The commissioners may extend to the Universities, or the City of London. A report of the proceedings of the board must be annually laid before Parliament.

DAVID HENRY, BARON, the resolute defender of Antwerp, was born at Thiel, in Gueldre, March 18, 1765. In 1775, he entered the Dutch army as a cadet, but he left that service after the revolution in Holland in 1787, and attached himself to the French army, in which he continued for many years. He became a lieutenant-colonel in 1793. In the fierce war with Prussia in 1806, he greatly distinguished himself under the Dutch general Dumouriez, and was made general of brigade. He afterwards took part in the Peninsular War, and displayed so much intrepidity that the soldiers nicknamed him General Bayonne, from his constant use of that weapon. In 1811 Napoleon created him a baron of the empire. He was frequently wounded, and during the campaigns of 1813 and 1814 he had several horses killed under him. He fought likewise at Wavre, in 1815. Soon after the peace he was made governor of Antwerp, and his admirable defence of the citadel in 1832, with a garrison of 6,000 troops, against an army of 76,000 French soldiers commanded by Marshal Gérard, attracted general attention throughout Europe. Bayonne made the brave old soldier very popular. He died on the 2d of May 1846. (Biog. des Contemporaines; Campo, Life of Chaste.)

CHATEAUBRIAND, FRANÇOIS-RÉNÉ, VISCOUNT D' OAKES. The French writer, who was born at St. Malo on September 4th, 1768, being the youngest of ten children. He was at first intended for the church, but after a careful education for that calling, he entered the army as sub-lieutenant in 1786. After various adventures he appears to have visited Paris shortly before the Revolution, and to have witnessed the capture of the Bastille in 1789. His erratic disposition took him to America in 1791, to look for the North-West Passage. He spent several months in the States, had an interview with Washington, and, after falling in love with the Virginian forest and wild scenes of primitive life which he has described so vividly in 'Rêve' and 'Atala.'

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 comfort and ease. He then drifted about the northern parts of France, and lived in the society of the nobles, equally wretched. The picture of his sufferings and privations at this time, as he relates them in his 'Mémoires,' is almost incredible. Nevertheless he continued in England nearly eight years, and maintained himself by translating for the Morning Post, giving lessons in French and Latin. 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 1799 he married the daughter of a Mr. Fontane, whose influence was already strong, and who had been appointed one of the editors of the 'Mémoires,' in the columns of which 'Atala' appeared for the first time. This romance was followed by the 'Histoire de Christiane' in 1809, 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 appointments. Unfortunately the execution of these schemes could not make the writer sufficiently anterior with the new government to furnish the inflexible Breton with just too an excuse, and he resigned his appointment the same day. Fontane, Madame Bacceochi, and even Josephine herself, could scarcely prevent the consequences of this rash act from falling on the 'Soldat.'

The reign of Napoleon, which lasted ten years (1804-14) was not favourable to literature, and during this period Chateaubriand produced nothing of note, save the 'Martyres' in 1807, and 'Histoire & Jerusalem' in 1811: the latter was the account of his own visit to the Holy Land in the autumn of 1806. The fall of the empire in 1814 released his pen, and he produced his famous pamphlet, 'De Bonaparte et des Bourbons,' the influence of which in disposing the people of France to the return of the Bourbons was powerful, that, "it was equal," said Louis XVIII., "to an army of 100,000 men." The Viscoun was now received with great favour at the Tuileries, but he refused office as a colleague with Fouché; and other circumstances delayed his entrance into public life until 1817, when he was sent as ambassador to the British court, and most honourably greeted by all classes of people. The next year he was appointed Minister of Foreign Affairs, an office he held during the first three years of the new empire. In 1818 his son was given him the embassy to Rome; but no sooner had the Polignac ministry been formed (August 8) than he resigned.

In 1828, after the fall of the monarchy, which he had assisted to destroy, this inexplicable man, whose people claimed as their leader, and followed with acclamations, deliberately resigned his titles, his offices, his very means of subsistence, to rally to that cause which had no other supporter. A singular change came over his spirit; he sank into a religious retired career, which deprived him not only of the world, but, perhaps, of the most perfect happiness. He studied the 'Mémoires d'Outre Tombe'—the reading of which is most painful. He died July 4, 1848. His character has been well summed up by a recent French writer:—"It was almost invariably the fate of M. de Chateaubriant to lead a double life: nature or duty, art or reality. Sometimes he was at the same time a hero and a villain, a saint and a rascal; at the same time a great man and a public character. At the very time he was crushing his adversaries, he had no influence over his friends."

(Mémoires d'Outre Tombe; Biographie Universelle; Dict. de la Biographie Universelle.)

CHATHAM. [Canada, S. 3.]

CHEMISTRY. Although the original articles on Chemistry in the 'Penny Cyclopaedia' were written up to the time they were produced, the progress of this science was so rapid that a large addition was made to them in the first supplement, and a further large volume in that work, under the head of Chemistry. In this
second supplement an addition of the like kind was found necessary, and the same plan has been pursued of adding the additional matter in an alphabetical form.

In the original articles in the "Penny Cyclopaedia" it was not thought necessary to represent the various compounds by means of symbols. The study of the science is however so much facilitated by the use of symbols, and the progress of organic chemistry so comparatively so far from intelligible without them, that we here subjoin a list of symbols most commonly used by the chemists of this country and the continent. To each of the symbols there is also added the equivalent or atomic number, an explanation of which will be found in the "Penny Cyclopaedia" article Aromatic Compounds.

<table>
<thead>
<tr>
<th>Name of Element</th>
<th>Symbol</th>
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<tbody>
<tr>
<td>Aluminum</td>
<td>Al</td>
<td>13.49</td>
</tr>
<tr>
<td>Antimony, or Sbium</td>
<td>Sb</td>
<td>129.49</td>
</tr>
<tr>
<td>Arsenic</td>
<td>As</td>
<td>75.00</td>
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<tr>
<td>Barium</td>
<td>Ba</td>
<td>135.48</td>
</tr>
<tr>
<td>Bismuth</td>
<td>Bi</td>
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</tr>
<tr>
<td>Beron</td>
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</tr>
<tr>
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<tr>
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<tr>
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</tr>
<tr>
<td>Cerium</td>
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<tr>
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<td>Fluorine</td>
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<tr>
<td>Glycerin</td>
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<tr>
<td>Hydrogen</td>
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<tr>
<td>Ilmenium</td>
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<tr>
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<td>In</td>
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<tr>
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<tr>
<td>Magnesium</td>
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<tr>
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<td>102.90</td>
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<tr>
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<td>Tantalum, or Columbium</td>
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<td>Tellurium</td>
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<tr>
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<td>158.93</td>
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<tr>
<td>Thorium</td>
<td>Th</td>
<td>232.04</td>
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<tr>
<td>Tin ( Stannum)</td>
<td>Sn</td>
<td>118.71</td>
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<tr>
<td>Titanium</td>
<td>Ti</td>
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<tr>
<td>Tungsten, or Wolfram</td>
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<tr>
<td>Uranium</td>
<td>U</td>
<td>238.03</td>
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<td>Yttrium</td>
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<tr>
<td>Zinc</td>
<td>Zn</td>
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<tr>
<td>Zirconium</td>
<td>Zr</td>
<td>91.22</td>
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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 thus the quantity of each element in a given weight of a compound may be ascertained. Most of the references relate to other names, given in the present article; where they refer to previous articles in the "Penny Cyclopaedia", P. C. is added.
However, to the inorganic as to the organic acids. It is very
obvious that the compound $\text{SO}_4^2- + \text{H}_2\text{O}$ may be arranged as
$\text{SO}_4^2- + \text{H}^+$, and that such a change may be effected in the ex-
pression of any of the acids. In this view of the com-
position of the acids, the hydrogen, not the water, is the re-
moveable element; and it would appear from experimental results, that the reaction on the oxygen of acids is
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
formula, we have the following:

- Sulfuric acid, $\text{SO}_4^2- + \text{H}^+$.
- Acetic acid ($\text{CH}_3\text{CO}_2\text{H}$) $\text{O}^+ + \text{H}^+$.

It has been objected to this theory that it assumes the
existence of compound radicals which have not been demon-
istic process, which we believe are only hypo-
thesis have now been separated, and no argument against
the theory can be successfully urged on this ground.
The advantage of this theory is, that the formation of salts
is easily explained, on the supposition that the metal replaces
the hydrogen of the acid. Thus, in the first system, sulphate
of soda was formulated as $\text{SO}_4^2- \text{Na}_2\text{O}$, and no account
was taken of the water lost by the sulphuric acid. But under the
new theory the oxygen of the metal needs not to be taken
into the formation, as it is already present in the sulphuric acid,
and the change from sulphuric acid to sulphate of soda is seen as follows:

Sulfuric acid, $\text{SO}_4^2- + \text{H}^+
Sulphate of soda, $\text{Na}_2\text{SO}_4$.

The sodium atom is in the place of the hydrogen.

In the constitution of the polybasic acids this theory is
more strongly confirmed. Thus phosphoric acid was sup-
posed to assume three forms, according as it united with one,
two, or three atoms of water, and these were called mono-
hydrated, bihydrated, and terhydrated acids. 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 their taking up the place of the hydrogen of
the acid.

That the old formulas for the organic acids may be easily
reduced to the new is seen in the following examples:

- Tartaric acid, $\text{C}_4\text{H}_6\text{O}_4 + 2\text{H}_2\text{O}$.
- Malic acid, $\text{C}_4\text{H}_6\text{O}_5 + 2\text{H}_2\text{O}$.
- Citric acid, $\text{C}_6\text{H}_8\text{O}_7 + 3\text{H}_2\text{O}$.
- Meconic acid, $\text{C}_6\text{H}_8\text{O}_7 + 3\text{H}_2\text{O}$.
- Saccharic acid, $\text{C}_6\text{H}_10\text{O}_7 + 3\text{H}_2\text{O}$.

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 regularity is not always observed. Thus, meconic, meconic,
which is tribasic, forms like trisubphosphoric acid three
series of salts, in which one, two, or three equivalents of the
hydrogen are replaced by the metal. While but the meconic
acid, as well as the trisubphosphoric acid, readily forms
with the metals, meconic acid in the state in which it is
replaced by silver; it cannot form, or forms 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 equi-
valents of carbonate (Gregory). This fact is difficult to be
accounted for on the old theory, whilst 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 oxygen easily, and we will not
form the compound with three equivalents of potassium.

Acroleine, $\text{C}_3\text{H}_4\text{O}_2$.
A substance obtained by Redten-
bach by the distillation of glycercine with phosphoric acid.
The operation must be carried on in vessels charged with
phosphoric acid, as acroleine 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 hydrated oxide of a radical called acrylic.
This substance resembles acetylene, and represents in acro-
leine the position of acetylene in aldehydes. Thus, $\text{C}_3\text{H}_4\text{O}_2 + \text{H}_2\text{O}$
is the atomic constitution of acroleine. But this substance
becomes more easily oxidized when condensed between
into acryllic acid, ($\text{C}_3\text{H}_4^2 + \text{H}_2\text{O}$), a substance
perfectly analogous to acetic acid. Acroleine is often formed
as the result of the distillation of oils and fats. Thus, casteor

Oil yields acroleine, and some other peculiar products on
distillation. Glycerine may in fact be regarded as an hydrated
oxide of acryllic acid with three additional equivalents of water, as
follows:

- Glycerine, $\text{C}_3\text{H}_5\text{O}_3$.
- Hydrated oxide of acryllic, $\text{C}_3\text{H}_5\text{O}_6 + 4\text{H}_2\text{O}$.

Alumrine.
Acrylic acid.
Acrylic acid.

Alumrine, $\text{C}_3\text{O}_4\text{H}_4\text{O}_2$.
When oleic acid is acted on by nitrile, several new acids are formed, and amongst
them oleic acid.
It occurs in round radiant masses, fusible and volatile.

Alanine, $\text{C}_3\text{H}_5\text{O}_2$.
When aldehyde-ammonia [Chemistry—Aldehyd, $\text{C}_3\text{H}_5\text{O}_2$] is acted on by hydroxylamine, and
an excess of hydroxchloric acid, a crystalline body, soluble in cold
water, is formed. This body is known as alanime. It is homologous with
glycosecol and leucine, and isomeric with lactamide, urethane and sarcosine.
When acted on by hyp-
nitrous acid, it is converted into lactic acid, as follows:

$\text{C}_3\text{H}_5\text{O}_2 + \text{N}_2\text{O}_4 = \text{H}_2\text{O} + \text{N}_2 + \text{C}_3\text{H}_5\text{O}_4$.

Alanine.
Lactic acid.
Nitrogen is given off during the decomposition.

Aldehyd-ammonia. [Aldehyde, $\text{C}_3\text{H}_5\text{O}_2$].
Aldehyd.

Alumrine, $\text{C}_3\text{H}_5\text{O}_2$.
This acid was discovered by
Schlieper, and is formed by the action of hydrochloric
acid on alloxanone. It is soluble in 15 to 20 parts of hot
water, and on cooling it is deposited as a crystalline powder.
When the solution is evaporated it gives out:

Alloxanone, $\text{C}_3\text{H}_5\text{O}_2 + \text{H}_2\text{O}$.
This acid is un-
known in the hydrated or separate state. It forms crys-
talline salts with beryta, potash, and soda. It is pro-
cessed by the action of hydrochloric acid on alcohol. The
alcohol unites with the cyanic acid and forms the new
compound which unites with the oxygen of ethyl, and forms
an aliphosphate of the oxide of ethyl.

Thus, $\text{C}_3\text{H}_5\text{O}_2 + \text{H}_2\text{O} + \text{O}_2$.

Cyanic acid. Alcohol.

Cyanic acid. Alcohol.

Allyl, $\text{C}_3\text{H}_5\text{O}_2$.
A compound radical, regarded as the base
of oil of mustard. This oil is composed of carbon, hydrogen,
and sulphur, and sulphur, which may be arranged as follows:

- C$_3$H$_5$O + C$_3$N + O + H + O.
- Oxyd of ethylene. Aliphatic acid.

Aluminum, the metallic base of the earth Alumina, which
is composed of oxygen and the metal aluminium. Its equi-
valent or atomic weight is 13.7, and its specific gravity 2.6.
The metal is procured by decomposing the chloride of alu-
imium by means of alkali. The theory of the decompo-
sition is that the chloride unites with the potas-
sium or sodium, and leaves the aluminium free. The metal
is procured by washing away the chloride. Till very recently
aluminium, although well known, had been procured only in
very small quantities, and was regarded rather as a chemical
curiosity than a substance of any value. It differed however
from the other earthly and alkaline metals by its not being
readily acted on by the oxygen of the atmosphere or water.
Thus, $\text{Al}_2\text{O}_3 + 3\text{H}_2\text{O}$, however, it was announced that M. Stainville,
chemist to the Emperor of the French, had succeeded in
obtaining this metal in very considerable quantities, and so
readily as to lead to the supposition that it might be employed in
the arts. The method employed by M. Deville is precisely
the same as that which has been used for many years for
extracting iron, on account of its lightness, and not being acted on by
oxygen, would undoubtedly be valuable for a great variety
of purposes, provided it could be obtained at a low price. Its
cost however has been very considerable on account of the price of the metals by which it is obtained. Sodium is pre-
erred, and, in preference to potassium, but this metal has first to be obtained by costly processes. These
last have been greatly diminished, so that sodium has been recently sold for 10s. a pound. This still renders the price of aluminium a barrier to the general use of that metal. Nevertheless, it has been extensively manufactured in Paris into spoons, tea-pots, coffee-pots, and other articles of use.
In order to obtain aluminium, the chlorid is introduced into iron tubes and heated with the sodium.

The chlorid of aluminium, from which the metal is prepared, is not a natural compound, but has to be made from the earth alumina. It is prepared by mixing this earth, fresh precipitated with some form of carbon or carbonaceous substance, as charcoal, sugar, tar, &c., and the whole is made into a mass which is exposed to the action of an iron tube and heated with the sodium.

Ammonite, another name for Ammonite. Ammonite. Ammonium, C₇H₇N₄O, is one of the bases obtained from oil of turpentine, and is one of the bases procured by the long continued action of weak nitric acid on that substance. It is also formed in the preparation of isatin (Chemistry—Isatin, S. 1). It is identical with nitric acid, which is formed by the action of nitric acid on salicin. It is a solid, fusible, and amorphous substance, forming fine yellowish white prisms, which shrink in drying. It combines with bases forming anilates. The anilate of the oxide of methyl (or methyl-gallinum) is obtained by the action of nitric acid on the oil of gaultheria, which is a salicylate of the oxide of methyl.

Ammonolysis, a non-analysed vegetable substance found in Angelica root (Angelica Archangelica).

Ammoniac Acid is Indigotico Acid = Nitro-salicylic Acid, C₆H₅NO₂ + H₂O. This is one of the substances formed by the decomposition of indigo, and is procured by the process of distillation of animal matter or coal tar, is identical 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 chlorarsonic and bromo-

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aniline passes spontaneously into anisio-unas. For a full account of the chemistry of this highly important compound, the reader is referred to the paper of Dr. Hofmann.

Anilotic Acid, C₆ N O₂ C₆ H₄ O₂, is a compound of aniline and cyanic acid.

Anilomelleone, C₆ H₅ N₃ O, a compound of aniline and maleic anhydride, is obtained by the heating of maleamide.

Anisidine, a substance obtained by acting on the oil of anise by strong acids, or the chlorides of tin or antimony. It is analogous to benzene.

Anisole, C₆ H₅ N O, is a compound of anisic acid and alcohol. It is obtained by heating anisic acid, which is itself obtained by oxidising the steapentone of oil of anise with nitric acid. Anisole is the radical of anisic acid when it is decomposed, C₆ H₅ O."
obtained in any quantity by fermenting sugar with cheese and adding chalk. Carbinic acid and hydrogen gases are set free.

**Cynane of Propyle, C₆H₇N.** It is a question whether this compound is a true cyanide, or a nitrite. It is formed among the products of the oxidation of albinous compounds.

**Butyramide, C₅H₇O₂N H₂.** This substance is produced by the distillation of the butyrate of the oxide of ethylene with ammonium in closed tubes.

**Butyron, C₃H₇O.** This substance is homologous with acetone and propione. It is less volatile than propione. It is prepared by heating the butyrate of baryta.

**Butyrobarbiturate of Ethylene, C₃H₇O₂N H₂.** This is a very fragrant and delicious ether, and is the principal element of the flavour found in the pine-apple, the melon, and some other fruits. It is this substance which is developed during the fermentation of the sugar from which rum is procured, and which appears to have got for this form of ardent spirits the name of pine-apple rum. This ether dissolved in alcohol, is sold in the shops under the name of essence of pine-apple, and is used for flavouring confectionery, &c. It is developed in rum more fully after long keeping. It is also found in some wines, and with acetic ether is one of the principal sources of their flavour.


**Camphor, C₁₀H₁₆.** This substance is obtained when common camphor (C₁₀H₁₆O) is distilled with dry phosphoric acid. It is found also in the oil of cumin. It forms with sulphuric acid a compound, called sulphophenylcyclohexanecarboxylic acid, C₆H₄SO₃C₂H₅ H₂O⁺ H₂O. **Camphoracid, C₁₀H₁₆O⁺ H₂O.** This acid is formed by the action of nitric acid on camphor. It occurs in the form of crystalline scales, which fuse at a temperature of 186°C, with the loss of carbonic acid, but sparingly soluble in cold water. When distilled, these scales are resolved into anhydrous camphoric acid and water. This acid combines with the oxide of ethylene, and forms two compounds:

1. **Camphoric ether,** an oily liquid, with a bitter taste and a nauseous smell.
2. **Camphorinic acid,** which has the power of forming soluble salts.

**Anhydrocamphoric acid, C₁₀H₁₇O⁺ H₂O.** forms a different substance from those constituted by the hydrated acid. It is a solid crystalline and volatile body, and yields an acid amide called camphoramic acid.

**Sulphocamphoric acid** is formed by the action of sulphuric acid on anhydrous camphoric acid with the disengagement of carbonic oxide. **Camphorinic Acid.** [Camphoric Acid.]

**Camphorn, C₁₀H₁₇O.** This substance is formed when camphor is passed over red-hot lime.

**Camphorose, C₁₀H₁₈O.** When camphorose (Indian rubber) is exposed to the action of heat, it first melts and then distils, and yields several oils which, like camphorose itself, are compounds of carbon and hydrogen. One of these is camphorose, which combines with chlorin, forming an oil C₁₀H₁₈Cl.

**Capral (Caproic Acid), Capramide, is produced by the action of ammonia on the caprate of the oxide of ethylene.** It occurs in the form of shining scales, which are fusible below 218°C. It is soluble in alcohol, and insoluble in water.

**Capral, C₆H₅O⁺ H₂O.** This acid is formed with many others from butter and goat's fat. It is also produced by the oxidation of the oil of rue. It has also been found in the oil of grain. It is a solid, fatty body, melting at a temperature of 40°C. It is sparingly 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 Japonic acid. Carbonate of potash produces in it a red crystalline compound, which is a red colour.

**Cathantine, the active principle of the various Cacti, which are used under the name of Sonna.**

**Cedrer, one of the products of the distillation of coal tar discovered by Reichenbach.** It is a volatile solid, and is obtained from coal tar. It is produced by boiling it with an alcoholic solution of potash. It crystallises in a solution of sulphate 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.
Chenopod, the compound $\text{C}_6\text{H}_7\text{Cl}_2$ is Chinopolanin.

The same plan is pursued with bromine. But in all these cases the hydrogen may be replaced by atoms of both chlorine and bromine. In the same way the vowels are made to do duty for these compounds, as follows: chlorophosphate, $\text{C}_6\text{H}_7\text{Cl}_2\text{Br}_2$; chlorobromophosphate, $\text{C}_6\text{H}_7\text{Cl}_2\text{Br}_2$; chlorobromophosphate, $\text{C}_6\text{H}_7\text{Cl}_2\text{Br}_2$; chlorobromophosphate, $\text{C}_6\text{H}_7\text{Cl}_2\text{Br}_2$; chlorobromophosphate, $\text{C}_6\text{H}_7\text{Cl}_2\text{Br}_2$. All these compounds are capable of acting as bases and combining with elements. Thus we have chloride of phosphorus, $\text{C}_6\text{H}_7\text{Cl}_2\text{P}$, and oxides of chlorophosphates, &c., bromide of chlorobromophosphates, &c.

Chlorosol [Chlorosol.] -- Chlorosol, $\text{C}_6\text{H}_7\text{Cl}_2\text{H}_O$, is one of the products of the action of nitric acid on chlorosol. It is a yellow solid, $\text{C}_6\text{H}_7\text{Cl}_2\text{H}_O$, in which it will be seen are contained all the important elements of the acid.

Chlorosol, $\text{C}_6\text{H}_7\text{Cl}_2\text{O}_3$, was first discovered in the bile by Gmelin. It is prepared by allowing a solution of dry bile in alcohol to be mixed with ether, when it deposits a crystalline solid. This is decomposed by sulfurous acid, and groups of radiated crystals are deposited, which are cholic acid. It is decomposed when heated with mineral acids and potash.

Cholestane, $\text{C}_6\text{H}_7\text{O}_3$, is produced from the decomposition of clavicular acid when boiled with acids. It is cholic acid with one equivalent less water. Cholic acid is uncrystallizable, and its salts are amorphous. This substance was formerly called resin of bile. When cholic acid is treated with hydrochloric acid, it is converted into a neutral substance, $\text{C}_6\text{H}_7\text{O}_3\text{N}_2$, by the loss of three equivalents of water.

Chromatophores, $\text{C}_6\text{H}_7\text{O}_3\text{N}_2$, is a compound of chromium and cyanogen. It combines with potassium, forming a yellow crystalline salt.

Chtistex, $\text{C}_6\text{H}_7\text{N}$, is one of the numerous compounds formed in coal tar. It is a yellow crystalline solid, melting at a temperature of 45°.

Chromophoic Acid, $\text{C}_6\text{H}_7\text{O}_3$, is found in the Permainia varista. It occurs in the form of golden yellow crystals, and with solutions of potash and ammonia, in alcohol, yields a beautiful red colour.

Cinnamaldehyde, $\text{C}_6\text{H}_7\text{O}_3$, the hypothetical radical of essence of cinnamomum.

Hydrate of Cinnamyl, $\text{C}_6\text{H}_7\text{O}_3\text{H}_2$, is the purified essence or oil of cinnamon. It is a fragrant oil, and forms with nitric acid a crystalline compound, $\text{C}_6\text{H}_7\text{O}_3\text{H}_2\text{N}_2$, which, when mixed with water, is resolved into its original elements, $\text{C}_6\text{H}_7\text{O}_3\text{N}_2$. When this oil is exposed to the air it absorbs oxygen, and becomes converted into cinnamic acid, $\text{C}_6\text{H}_7\text{O}_3\text{H}_2$. This acid is also easily obtained by dissolving oil of Balsam of Peru in a solution of potash in alcohol, evaporating to dryness, dissolving in hot water, and adding to the cinnaeate of potash the former, hydrochloric acid. Nitric acid converts it into the hydriat of benzoyl. When added to cold nitric acid it is converted into nitro-cinnamic acid. The salts of this acid are volatile.

When chlorine is applied upon fusing sulfurous acid, sulfo-cinnamic acid is formed.

Cinnamaldehyde, $\text{C}_6\text{H}_7\text{O}_3$, is found in Balsam of Peru. It contains cinnamic acid united to an ether.

Cinnamyl, $\text{C}_6\text{H}_7\text{O}_3$, is formed when cinnamic acid is distilled with baryta.

Citroconic Acid, $\text{C}_6\text{H}_7\text{O}_3\text{H}_2$, is formed from Iaconic acid, $\text{C}_6\text{H}_7\text{O}_3\text{H}_2$, which is again formed from Acetic acid, $\text{C}_6\text{H}_7\text{O}_3$. The last acid is found in the Aconitum Narpeatus, and in the Cinnamaldehyde.

Cinchine, $\text{C}_6\text{H}_7\text{O}_3\text{N}_2$, an active principle found in the group Cynaraeehele of the compositional order of plants. It is neutral and bitter.

Chelerythrine, the active principle of the meadow saffron (Chelerythrine), $\text{C}_6\text{H}_7\text{O}_3\text{H}_2$, has a taste at one time regarded identical with veratrine. It is soluble in water, alcohol, and ether. It forms salts with the acids, which are bitter, acrid, and poisonous. In small doses it causes purging.

Chelidonic acid is formed in the cercidacee of the plant Chenopodium.
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, amyl, butyl, cetyle, and camphenyl, &c.

Collodion. [Gun Cotton.]

Creatine, C6H5N2O2. This body, originally discovered by Chevreul, occurs in transparent very brilliant crystals. It is also found in the urine of persons suffering from a state of phthisis. It dissolves in 74 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 in alcohol, but not in ether. 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 exudable matters are then removed by boiling, and the phosphates by a solution of 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.

Creatinina, C6H4N2O3, was discovered by Liebig. It is obtained from creatine by the action of hydrochloric acid. It is found also in the muscles and the urine, with creatine, which is an essential constituent of their normal condition. But in petrified flesh and urine no creatine is found. Hence creatinina may be regarded as the result of the decomposition of creatine.

Cumidine, C7H8N2, is obtained from the oil of cumin. It is the crystalline base, resembling anistane; and like that base it combines with chlorine, bromine, &c. Cumidine, C7H8N2, is found in the oil of cumin and in the oil of coriander. Cymidine, C7H8N2, and cymol, C6H10O, are found in companies with the above compounds in the same oil.

Cyamylene, C6H6O2, is the essence of the latter. 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 a liquid potassa with disengagement of ammonia, and a little water is used for its solution.

Diphtyle, C10H14O, is obtained by heating oil of turpentine with lime. It is a pure oil.

Diamylamine. [Amyl.]

Dihydroaminline. [Amyl.]

Dichloraminline. [Amyl.]

Diethylamine. [Amyl.]

Dietylamine. [Chloric acid.]

Elaidic acid, a fatty acid, obtained by the action of nitric acid on oleic acid.

Ethylene. When aldehydes have been kept for some time in sealed tubes, it has been found to be converted into two polymeric bodies, metaldehyde, a hard crystalline inodorous solid, and elaldehyde, which is a liquid.

Ethylcarboxylic acid, ethylcarboxylic acid, C6H4O2. One of the acids found in the Perentia roccella and Ruccella tineoria, lichens which yield the commercial substance arachis. This acid is the most important of all the principles found in lichens. It yields ether when boiled with alcohol. Besides its eutropic, eutonic, alpha acetole, beta acetole, and rassidic acids have been found in lichens. They yield red dyes with ammonia, and are employed extensively in the dying of cotton and woollen cloth. These acids have been investigated by Schunck and Stenzhoven, and the latter recommends that the latter in three parts of water, 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 lower filled with water. As the water is evaporated, so as to drop which gives a deep purple red colour with bleeding liquor, a character belonging to all the acids which yield arachis. The solution is then saturated with hydrochloric acid, and a gelatinous precipitate falls, which is then separated; then the acids are extracted by means of water, which are then separated. Thus the acids are extracted from the 'oak acid' without boiling, which will form ether compounds.' (Gregory.) Besides the acids there are three other compounds found in the lichens used for dying—Orincine, Picoeroinhyine, and Brythromannite.

Orincine, C6H4N2O2, 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 gradually a deep red colour, and when mixed with the fixed alkalis it has a rich violet colour.

Picoeroinhyine = Erthyrin—bitter = Amarynth, C6H6NO3, is formed when ethyric acid, or the lichens containing it, are burnt. Erthyrin, C6H4O3, is formed when picoeroinhyine is boiled with baryta. It is dissolved by water and alcohol. It forms large colourless crystals, which have a sweet taste.

Ethyal [Cetyle.]

Ethylal [Cetyle.]

Ether, Butylage [Butyle.]

Ether, Camphorose. [Camphoric Acid.]

Ether, Amylic. [Amyl.]

Ethylamine. [Ethyle.]

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 iodides of ethyle. The following equation expresses this result:

C6H5 + I + Zn = ZnI + C6H5. Part of the ethyle, however, is converted into zineethyle, C6H5 + Zn, and another part into methyl and ethyle. In the latter case of the decomposition of the ethyle, the carbon becomes a colourless gas, having a faint smell like ether, and burning with a bright flame. It has a specific gravity of 2.00394, and is condensed into a liquid with a faint smell.

Oxide of Ethyle = Ether = Sulphuric Ether, C6H5O. This ether is occasionally found in nature combined with acetic, butyric, and other ethers, which are found giving beautiful samples of its aromatic and ethereal qualities. 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 represents acetic of potash, and KO represents benzoate of potash, so C6H5O represents acetic of alcohol, and C6H5O represents benzoate of ethyle. [Ether.]

Hydrated Oxide of Ethyle = Alcohol, C6H5O + H2O = C6H5O2. 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 distillation of ethyle or alcohol, which is composed of C6H5O2. During fermentation this compound loses 4 atoms of carbonic acid and leaves behind 2 atoms of the hydrated oxide of alcohol. Thus

Glucose

2 atoms of alcohol

2 atoms of alcohol

4 atoms of carbonic acid .

Azemoloc, P.C.

Chloride of Ethyle, C6H5Cl, is formed by saturating alcohol with hydrochloric acid, and distilling the mixture in a vapour-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 element.

Hydrosulphuret of Sulphuret of Ethyle = Mercaptan, C6H5S, or C6H5H+S, is formed when the double sulphate of lime and oxide of ethyle is distilled with its own alkali of a sulphuret of potassium, with saturated with sulphuret of hydrogen, and converted into K + S + H.S. It has a powerful and penetrating odour, smelling like the essence of onions concentrated. It adheres to the hands and clothes most perniciously, and is a most offensive subject to operate upon. Zeus has the odour of hydrosulphuret of ethyle and sulphuret of potassium. It is a volatile liquid, having an offensive allisious odour.

Cyantide of Ethyle, C6H5-Cy = C6H5N2 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 stufication when inhaled.

Oxide of Ethyle unites with sulphuric and phosphoric acid.
acids, forming sulphates and phosphates. Nitrates of the oxides of Ethyl, $C_2\text{H}_4\text{O} + N\text{O}_3$, is the Nitre Ether of Nitrous Oxide, but the least least of the various theonic agents which have been recently employed in medicine. It is a liquid, having a specific gravity of 1.50, and is transparent, colourless, and volatile. It is best obtained by distillation with alcohol and with water to the boiling point (chlorinated lime). It is then well washed with water and redistilled, and washed with sulphuric acid to remove the water and other adulterations. [ANESTHETICS—MATERIA MEDICA, S. 2.]

When the fumurate of oxide of ethyl, which is a heavy oily liquid, is acted on by aqua ammoniac, it forms a white insoluble powder, which is fumarae, and possesses all the characters of a compound amide. The oils which contaminate potato and grain spirit are called by the Germans under the common name fueseld, and the same term translated is applied by English chemists to these oils. Potato spirit is accomplished by the hydrated oxide of amyle, or oil of potato spirit [ANHYDROUS], whilst grain spirit is accomplished by an oily matter consisting of margaric, capric, and cynamic acids, which probably, with the spirit form their corresponding ethers. Dr. Gregory suggests that this is probably the composition of the Glyceryl, $C_3\text{H}_6\text{O}_2$, of the Oleum Murd. [ACROLEIN, N. 1.]

Oxins, a name given to humus in common with ulicina, humic acid, ulmic acid, humine and geic acid. This substance is obtained from common mould, which when boiled with alkalis, and the solution filtered and treated with acids, yields a substance, which has the name of Oxin. [ACROLEIN, N. 1.]

Omea*, a non-aërial vegetable compound, obtained in the form of yellow needles from the Gentiama latua. Glaucesin, an alkaloid found in the leaves and stem of Glaucium tinatum. It forms salts with the acids, and has a little bitter taste. It is a volatile volatile, which occurs in the plant, differs from the above compound. The composition of both is doubtful.

Glyceryl, $C_3\text{H}_6\text{O}_2$, is the hypothetical radical of the substance called Glycerine, which is the hydrated oxide of Glycine, $C_3\text{H}_6\text{O}_2 + H_2O$. [ACROLEIN, N. 1.]

By the action of heat Glycerine is decomposed, and a volatile principle is produced, which is called Acrolein. [ACROLEIN, N. 1.]

Glycerine is the substance that combines with the fatty matter, fats, and oils. Berzelius, however, has suggested that this compound is not present in some fats, but that a body having the composition $C_3\text{H}_6\text{O}_2$ occurs, and which has oxide of lipide. Two atoms of this substance with three of water will form the hydrate of the oxide of glycerol; thus, $C_3\text{H}_6\text{O}_2 \cdot 3 (C_3\text{H}_6\text{O}_2) + 3 H_2O$.

Glycocin = Glycosol = Sugar of Gelatine, $C_3\text{H}_6\text{N}_3O_8$ is a compound found amongst the products of boiling gelatine with potash or acids. It may also be prepared by heating hippuric acid with hydrochloric acid, when benzoic acid, water, and glyccolin are produced. It forms transparent crystals, which are soluble in water and sweet to the taste. It combines with acids and bases. Its easy formation from the animal compound gelatine, has led to the supposition that it may play an important part in the animal body.

Guaiacyle, $C_3\text{H}_4O$, the theoretical base of the resin called guaiacum. If this resin is distilled, an oily liquid is obtained, which is regarded as a hyduret of guaiacyle, $C_3\text{H}_6O + H_2O$.

Guadin, $C_3\text{O}_2N_2O_4$, a compound discovered by Unger in guano. It resembles urea in its properties, forming crystalline, tasteless salts with hydrochloric, sulphuric, and nitric acids. It is a white powder, and soluble in water. Its salts are all neutral or acid, none basic.

Guadin, $C_3\text{H}_6O_4N_2$, a substance identical with thine and caffeine, and found in the Guarania officinalis.

Gum-Corrus, a substance discovered by Professor Schieb, being a gum obtained by simmering down ten parts of an acid composed of equal parts of sulphuric and nitric acids. After immersion for about two minutes, the wool is withdrawn and the liquid is pressed out, and it is rapidly washed with water till all remains of the crude zone. One hundred parts of cotton thus treated yield one hundred and sixty-nine parts, of which one hundred and two
are nitric acid, water has disappeared, and the rest is cellulose.

It is often sold to carpet and feschemacher, gun-cotton consists of C\textsubscript{10}H\textsubscript{8}O\textsubscript{2}, 4\textsubscript{10}O. If it is not dried it is superseded by gunpowder, as in fire-arms its explosive force is inferior, but in the blasting of rocks it possesses some advantages over gunpowder. Gun-cotton is soluble in ether, and a compound is formed in delicate bags into which hydrogen may be introduced for balloons. In photography the colloid 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. Hall, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O\textsubscript{2}, is alkaloid occurring in the seeds of Peganum Harmala.

They are united with phosphoric acid. Harmaline forms yellow salts with the acids, and is transformed into a red salt by oxidising agents. The harmal 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. Harmeline yields a number of substitution products, such as nitratin, aluminoharmaline, &c.

Harmine, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O\textsubscript{4}, a compound formed when salyacine is acted on by diluted nitric acid. It contains the elements of sugar and hydrost of hydrogen. It crystallizes in the form of minute, transparent prisms. When heated in 300\textdegree C it forms a resinous insoluble substance.

Harmeline, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O\textsubscript{4}, is a concrete volatile principle allied to the essential oils. It is a solid crystalline body, and is derived from the Jauda Helminthum. With nitric acid it yields nitro-harmeline, &c.

Harmic Acid, C\textsubscript{10}N\textsubscript{4}H\textsubscript{4}O, is found in large quantities in the urine of the cow and horse, and other herbivorous animals. It has also been detected in human urine. It is prepared by boiling the urine of the horse or cow with a small bulk, and decalcifying with hydrochloric acid. The mixture deposits brown crystals of hippuric acid, which may be made white by boiling with lime, and dissolving the hosphate of lime, and again adding hydrochloric acid, when the pure hippuric acid is thrown down. It forms large semi-transparent four-sided prisms, which are sparingly soluble in cold water, and very soluble in hot water and in alcohol. Under heat it melts and gives off benzoic acid, benzate of ammonia, and a fragrant oil. It forms salts which are soluble and crystallizable.

Harmic Acid. [G. Hmin.

Harmine. [G. Hmin.

Harmine Acid, C\textsubscript{10}N\textsubscript{4}H\textsubscript{4}O, discovered by Unger, and formed by boiling cane sugar with hydrochloric acid and chloride of potash. It differs in composition from uric acid by 1 equivalent of water and 2 of oxygen, hence its name. It is colourless, and crystallizes in short rhombic prisms, and when heated, is resolved into hydrated cyanic acid, water, and carbon.

Harmine Acid, C\textsubscript{10}H\textsubscript{8}, a hydrocarbon found in the mines of Idria. It colours sulpheric acid intensely blue. It is probably identical with succiniterene, a substance obtained from amber, and which has the same property of colouring oil of vitriol intensely blue.

Harmine Acid, C\textsubscript{10}H\textsubscript{8}O\textsubscript{2} + 4H \textsubscript{2}O, is a peculiar species of sugar, discovered by Scherer in the juices obtained from the flesh of animals. It crystallizes in large crystals, which have a sweet taste, but which do not enter into a state of fermentation. It yields, however, both lactic and butyric acids when exposed to the action of caseine. It differs from glucose in not giving the usual reaction with the salts of copper and potash, and in possessing two atoms more water in its composition. It has not yet been found ready formed in the animal system.

Harmine Acyrogen, C\textsubscript{10}N + Ir, is a hypothetical compound radical. It forms with hydrogen triiodic acid, and with potassium, a compound of potassium, of a form of colourless crystals, and gives a deep indigo blue with the salts of peroxide of iron. This is one of the many compounds of a metal with cyanogen, like ferrocyanogen, and which have all the power of combining with other metals possessed by that body. Thus there are cobaltocyanogen, chromocyanogen, platinocyanogen, &c.

Isatinic Acid, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O\textsubscript{2} + H\textsubscript{2}O, is formed by the action of a strong solution of potash on isatin, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O. The compound forms a pale solution of starch, from which the isatinic acid may be separated. It is, however, at once resolved into isatin and water, but if isatinic acid is treated with sulphurised hydrogen in vacuo, a white flocculent powder is obtained, which becomes red on being dissolved by boiling water, and the solution on cooling deposits isatin.

Isatinic acid unites with the metals, the latter representing in the various compounds the hydrogen of the water.

Isatide, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O, is a product of isatin, when this substance is heated with baryta, ammonium, arsenic, and a grey crystalline powder, and represents isatin with one equivalent of hydrogen. This equivalent of hydrogen may be supplied by chlorine and sulphur, and thus chlorisatin and sulphisatin are produced. Isatinic acid forms with Suraminine in the Geofroia phymatina and G. Suraminens. They are crystallizable alkaloids, capable of forming with the acids salts, which are precipitated with tartrine and corrosive sublimate.

Kakodine. [Kakodyl—CHEMISTRY, S. 1.]

Kino or Quinic Acid, C\textsubscript{10}H\textsubscript{8}O\textsubscript{4} + 2 H\textsubscript{2}O, is obtained from cinchona bark, in the manufacture of sulphate of quinine. It occurs in the bark united with the quinine, and when lime is added to a solution of bark, a kinate of lime is formed. The kinate of lime is used as a substitute for the kinate of lime, and for the mineral water contents of mineral water, which is so soluble in water, having a pungent smell when the state of the vapour. When kine is acted on by reducing agents, it takes up 2 and 4 equivalents of hydrogen, forming green and white hydrogen kinate. The first forms a crystal of crusts of exceeding beauty, the latter are white. Woehler has obtained several compounds of kine, of which the following tabular statement gives the names as far as they are yet known:

Kino... C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}

Green hydrokinate... C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}

White hydrokinate... C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}

Chlorhydrine... C\textsubscript{10}H\textsubscript{8}ClO\textsubscript{4}

Chlorokinate... C\textsubscript{10}H\textsubscript{8}ClO\textsubscript{4}

Brown sulphhydrine... C\textsubscript{10}H\textsubscript{8}S\textsubscript{4}O\textsubscript{4}

Yellow sulphhydrine... C\textsubscript{10}H\textsubscript{8}S\textsubscript{4}O\textsubscript{4}

Brown Chlorosulphokinate... C\textsubscript{10}H\textsubscript{8}ClO\textsubscript{4}

Orange... C\textsubscript{10}H\textsubscript{8}ClO\textsubscript{4}

Kreatine. [Kreatine.

Kreatinine. [Kreatine.

Kynole. [Aniline.

Lactamide, C\textsubscript{10}H\textsubscript{8}N\textsubscript{4}O, is obtained by the action of lactic acid on ammonia. It is interesting as being identical in composition with the body, isolated from the leishman which are urethane (carbamate of the oxide of ethylene). They have all of them, however, very distinct properties. This substance differs from the others in yielding lactic acid and ammonia when acted on by acids, hence its name.

Lactargine is the active principle of the Lactaæa vivipara, or wild letuce. It is obtained from the juice of this plant, which is called Lactascarium. It is a bitter, crystalline, resinoid substance, possessing anodyne properties.

Lamic Acid. Another name for Aldehydic acid. [ALKYDIOIC ACID—CHEMISTRY, S. 1.]

Lactic Acid, C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}H, a crystalline fatty acid, obtained from the fat of the berries of Laurus nobilis. It forms a salt with the alkalies. Lecanora, C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}H, is found in several lichens, especially Lecanora tartarea, and Gyrophora purpulata. It occurs in the form of minute white crystals, which are insoluble in water, but soluble in ether and alcohol. When heated with alkalis, it yields a carbonate of the alkali, and a sweet substance called oxine. Thus:

C\textsubscript{10}H\textsubscript{8}O\textsubscript{4} + 2 CO\textsubscript{2} + C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}

lecanoric acid.

lecanoric acid.

The same change takes place when lactic acid is boiled in water. By the action of air and ammonia, this acid is gradually converted into a deep blue or purple colour (Estyrich Acid). This acid combines with bases, and with bases, and bases.

Lecanoramic Acid, C\textsubscript{10}H\textsubscript{8}O\textsubscript{4}H, is the yellow dyes of the Pseudorubrina of Heeren, and the Estyrich of Rassum. It is produced by boiling the lichens with alcohol. It was dis-
covered by Schunck, to whom chemistry is greatly in debt, for a knowledge of the compounds contained in the lichens.

Leucoroea 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 brownish yellow colour, and acts in the same manner as gum, and is externally used instead of this substance in calico printing.

Lucic Acid, C₂₀H₁₇O₄, an organic acid belonging to the leucine series. Leucic Acid C₂₀H₁₇O₄ is a substance identical in composition with glycocine 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 peroxide of hydrogen, acetic acid, sulfuric acid, and hydrochloric acid. This 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 albumen.

Lucoline = Quinoline, C₇H₈, is one of the compounds found in the least volatile portions of the basic oil of coal-tar. It is also formed when quinine, cinchonine, strychnine, or thiaidine are heated in contact with potash. It is a liquid with a disagreeable smell, and boils at the temperature of 460°. It neutralises acids, and forms with the salts.

Lucorohamine. [Halihaline.]

Licinine, C₂₀O₁₈H₂₀, is a variety of starch found in the Lichin islandicus, or Iceland moss. It is colourless and tasteless, and forms a jelly-like mass in cold water and dissolves in hot. Its solution is not coloured blue by iodine, but the jelly is. It is converted into sugar by dilution and boiling sulphuric acid.

Limonine, C₁₅H₂₀O, is a bitter crystalline substance found in the seeds of lemons and oranges. It closely resembles Cinine, the bitter principle of the Cinnarespinha. It contains 2 atoms less water.

Lipide. [Glycine.]

Liphine, C₆H₈N₂, is one of the bases derived from the oil of the common lichens. It is formed when hydrobenzoide (C₆H₈N₂) is distilled. Ammonia is given off, and liphine 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 trihydroxyphyline.

Luteolin is a non-organic colouring principle found in the word (Istes tinctoria). It is volatile and crystallisable.

Luteolin and Malamine Acids, are synonyms of Asparagine and Aspatic acid. [Asparagine - Chemistry, S. 1.]

Melampaprine is a crystalline non-oxidised substance obtained from the cow-wheat, Melampyrum nummularium. It is an organic compound hitherto unknown.

Melanic Acid, C₂₀H₁₇O₄, is formed from cane sugar by the action of heat and alkalies. It has a very dark colour, and when thrown down by hydrochloric acid appears as a black flocculent deposit.

Melasin Acid, C₂₀H₁₇O₄, is one of the substances yielded by wax. According to Brodie, when the hydrated oxide of melasine or melasine is heated with lime and potash, it yields hydrogen gas and melasinate of the base. When the acid is separated, it presents itself as a crystalline wax substance, melting at 192°.

Melline. [Melline - Chemistry, S. 1.]

Mellin, C₂₀H₁₇O₄, 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 palmic acid. The palmic acid is easily separated from the hydrated oxide of melasine by saponification. The latter is a true alcohol, and, like common alcohol, yields a carbohydrate resembling ethanal gas. Its composition is C₂₀H₁₇O₄. It is identical with melasine or melasnic alcohol. 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 two of which are known.

Menbrerine, C₂₀H₁₇NO₄, is a white fusible crystallisable alkaloid, forming salts with the acids found in the seeds of the Menispermum Cocculus, known as Cocculus Indicus.

Menbracine is a non-oxidised uncrystallisable neutral principle found in the common buck bean, Menyanthes trifoliata.

Methicole, C₂₀H₁₇O₄, is obtained from the distillation of acetone with fuming sulphuric acid. Thus, 3 equivalents of acetone = 3(C₆H₄O₄), yield 6H₂O and mesitylole. The atoms of hydrogen may be substituted by chlorine, bromine, and nitrous acid.

Metascopic Acid, C₂₀H₁₇O₄+H₂O, is an acid described by Gottlieb and obtained from the action of nitric acid on citraconic acid. It forms minute crystals, sparingly soluble in water.

Methionone Acid, S₈O₄C₂H₂O₄, this acid with Ethionic, Iethionic, and alicionic acid is formed by the action of sulphuric acid on ether and alcohol.

Methyl alcohol. [Aline.]

Methylidithyramyllium. [Aline.]

Methylidithyramyllamine. [Aline.]

Myosilibrium. Balsam of Peru, according to Richter, contains two oils, myroxylne, which is insoluble in alcohol and myrospermine, which is soluble in that liquid. The latter substance when treated with an alcoholic solution of potash yields a yellow resembling cinnamic acid, which is called myrospermic acid.

Myristic Acid, C₆H₄O₄+H₂O, is a crystalline fatty acid found in the seeds of Myristica noothaca, the common nutmeg. When united with the oxide of lime, it forms the fat of the nature with the oxide of ethylene a myristate which is an oily liquid.

Naphtharline, C₆H₄O₄, or C₆H₄O₄, is found in all kinds of tar, but especially in coal tar. It is easily obtained by redistilling this last product when it occurs in a semi-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 acrid taste. It is volatilised like camphor by exposure to the air, and boils at a temperature of 414°. It forms with bromine and chlorine 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 them great force of substitutions, which has been one of the most remarkable aids to the development of modern organic chemistry. [Chlorophenolase.]

The compounds of chlorine and bromine with naphthalene are of very great importance, have been carefully described by Laurent. The whole of the possible compounds of these two elements with naphthalene amounts to the large number of 1040. In the same manner sulphuric and nitric acids are found to act on naphthalene, and to give a large number of compounds highly interesting to the chemist, but which have not yet been fully studied. The following are a few examples of these compounds:

Hyposulphonaphthalic acid. C₆H₄O₄S⁺H₂O.

Hyposulphonaphthalic acid. C₆H₄O₄S⁺H₂O.

Sulphonaphthalic acid. C₆H₄O₄S⁺H₂O.

Sulphonaphthalic acid. C₆H₄O₄S⁺H₂O.

Nitronaphthalin Acid. C₆H₄N+O₄.

Thionaphthalic Acid. C₆H₄N+O₄.

Nitronaphthaline Acid. C₆H₄N+O₄.

Nitronaphthal. C₆H₄N+O₄.

Oxidine. [Phyloline.]

Ganatic Acid, C₆H₄O₄O⁺H₂O, is found in wines in combination with oxide of ethylene, forming an ether, which is one of the elements of the oil of wines. It is also found in the spirit of fermented grain. In order to obtain the acid, the ether is decomposed by caustic potash, and the oxamethane of patah thus formed is distilled with dilute sulphuric acid. The acid thus obtained is a semi-liquid, insoluble in water, but soluble in alcohol and ether. The oxamethane of oxide of ethylene, oxamethanic 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 ferrocyanide of one of many others which give the peculiar odours or bouquet to wines. [Mulder's Chemistry of Wine.]

Ganatlhy, C₄₄H₄₄, is known by some of its compounds.

Hydroxyl Oxide of Brandywine—Ganathile—Ganathile—Ganathile—Ganathile—Ganathile—Ganathile—Ganathile—Ganathile. C₂₀H₁₇O₂+H₂O, is the aldhyde of vanillin acid, and is obtained from castor oil. Ganatnile Acid, C₆H₁₄O₂+H₂O,
is an oily acid, and yields fatty salts. The esteramides of the oxides of ethylene and methyle are fragrant compounds.

Oxyammonium, C₆H₅(NO₃)₂, is obtained from the opianate of ammonia by the loss of one equivalent of ammonia and four of water. It is a pale yellow powder, which, when boiled with water, yields an oil and a salt of methyle.

Oxyammonium, C₆H₁₀(NO₃)₂, is formed from the decomposition of Nocadine, one of the compounds contained in opium. This acid forms soluble and crystallizable salts, with the oxides of the metals and oxides of ethyle. The latter is sparingly soluble in water.

Oxamnine, C₆H₅N₂O₂, is a crystalline compound found in company with narcotine and other compounds in opium.

Oxanthine, C₆H₆(O₃)₂, is formed by the action of nitric acid on narcotine. It crystallizes in fine needles, which are soluble in ether and alcohol and become of a deep purplish black when brought in contact with sulphuric acid.

Oxyne. [Erythric Acid.]

Oxysedonine. [Atumniante.]

Oxalic Acid, C₂O₃N₂H₄, is one of the products of the action of heat on oxalate of ammonia. This acid forms soluble and crystallizable salts, with lime, baryta, ammonia, and oxide of silver.

Palmitic Acid. [Ostle.]

Palmitin, C₁₈H₃₅O₂, a crystalline base discovered by Merck in opium.

Paramide, C₆H₄(NO₃)₂, is formed when mellitate of ammonia is heated in a retort to about 300°C. It is accompanied by another body called Euchronic Acid. Paramide is a solid yellow liquid, which, when boiled with water, is changed into a bimellitate of ammonia.

Paraphenylthalline = Anthracene, C₁₄H₁₀, is a substance polymeric with naphthaline, and also found in coal tar. It melts at 356°C and distils at 359°C, crystallizing in its foliated plates. It has the properties of a number of compounds, in which oxygen is substituted for hydrogen. These compounds are again capable of uniting with hypotonin acid. As with the compounds of naphthaline we are indebted for all that is known of the researches of Laubarn, with a rancid smell. It is a liquid base of low temperatures, and its salts form soap. It forms a Pereloxane of the oxide of ethyle, C₂H₆O⁺⁺ C₂H₄O⁺⁺, which is an oily liquid of a very peculiar smell. It is a compound in the manufacture for giving perfume the Baltimore of the old. It is probable this acid is formed from sugar, as all oily acids are found to be.

Phenyle, C₆H₅H₂O₂, the hypothetical base of carabolic acid, which according to Laurent is an hydrated oxide of Phenyle, C₆H₅O⁺⁺ H₂O⁺⁺. Laurent has succeeded in obtaining with this radical phenylen of a series of compounds resembling those of indigo,osalicylic, and other bodies.

Phthalamide, C₆H₅N₂O₂, is a non-combined compound, crystallizing in silver scales and of a bitter taste, obtained from various species of Phyllorea.

Phlorotina. [Phlophizin.]

Phloridenin. [Phlophizin.]

Phloridzin. [Phlophizin.]

Phloridzin. C₆H₁₀(NO₃)₂, is a substance closely resembling salicine. It is obtained from the roots of the apple, pear, plum, &c., and is extracted in the same way as salicine. It crystallizes in the form of small scales, which are soluble in hot water and in alcohol. It is a very bitter and powerfully febrifuge. When boiled with dilute sulphuric acid, it yields a resinous substance called phlorotine, C₆H₁₀O₂, and grape sugar. If phloridzin moist be exposed to atmospheric air and ammonia it forms a deep red substance, soluble in ammonia, which changes into a white powder by dilution with water. It has the same elements as phlorizin, with eight equivalents of oxygen and two of ammonia. This forms phloridzin.

Phlobaltamide, C₆H₅N₂O₂, is formed from phthalic acid by ammonia.

Phlobaltic Acid, C₆H₅O⁺⁺ + 2HO₂, is formed by the action of nitric acid on chloridate of naphthaline.

Picolin, C₆H₅N⁺⁺, is a volatile oily base, isomer with aniline, and found in coal tar. It has very powerful basic properties, and is the same substance as the odorous described by Unverdorben.

Picric Acid = Carboxylic Acid = Nitroprussic Acid = Nitrophenic Acid, C₆H₅O⁺⁺ H⁺ + HO₂, is formed by the action of nitric acid on anillic acid, indigo, salicine, salicylic, salicylic acid, hydrate of phenyle, common salt, 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 be habit forming even by adulterating bitter beer. It is fusible and volatile, readily uniting with bases; its salts crystallize and explode when heated.

Picrotin, a bitter principle obtained from the seeds of Mespernum Oculatu (Oculata Indica). It forms white prisms on evaporation, and appears to be a vegetable base containing nitrogen.

Pikryle = Picrine, C₆H₅N⁺⁺ NO₂, is yielded by the distillation of the product obtained by acting on oil of bitter almonds with sulphuret of ammonium. By the action of nitric acid it is converted into trimicropicryle C₄H₆(NO₂)₃.
hydrogen, and sinnamine is left. It forms definite compounds with chlorides of mercury and platinum.

**Syringolamine**, C₈ H₈ O₈, one of the three solids which, according to Kane, exist in tannins, in addition to Erythroline, which is a red fluid. The other solids are Aulosmine and Erythroline.

**Stilbene**, C₆ H₄, one of the products of the decomposition of the compounds of benzoyl. It is formed from the hydrous acid, and is known to be less soluble in water when heated, gives off sulphured hydrogen, and at last distils over, in nearly scales, stilbene. It forms a compound with chloride when this gas is passed through melted stilbene. Bromine combines with stilbene, forming bromide of stilbene, with the addition of nitric acid, nitro-stilbene, nitro-stilbene, and nitrotoluic acid.

**Styracine**, C₆ H₈ O₈, is a substance procured from liquid storax, by distillation with carbonate of soda. At the same time it yields a small quantity of soda and sinnamine, C₆ H₈ O₈. It is probable from this fact that styrole and cinnamole are the same substance. Styracine may be regarded as a compound of cinnamic acid, C₆ H₅ CO, with the oxide of a compound radical, C₆ H₄, which is called styrile. If styracine be heated with a solution of potash, a cinnamate of potash is left, and a hydrated oxide of styrile distils over. This substance exists in two forms, as a solid and as a liquid, and has been described under the name of styrene.

**Syrone**, C₆ H₈ O₄, is a hydrochloric redoubled saccharic acid, which would thus have this formula, C₆ H₈ O₄ + H O. **Sudaminine.** [Jamaic.] **Syrnaptase)** = Emulcin. The white part of both sweet and bitter almonds is principally composed of a peculiar matter very soluble in water, which has been called syriptase by M. Robiquet. It appears to be identical with a substance described by Liebig and Wöhler, and called by them emulcin. Robiquet prepared syrnaptase by submitting sweet almonds, from which all the oil had been expressed, to maceration for two hours, and then subjected 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 sap contains a good deal of acetic acid, sugar and syrnaptase. The lead may be thrown down by sulphured hydrogen, and the sapnaptase by alcohol. The sapnaptase should be washed with alcohol, and dried in ovens over sulphuric acid. The dry sapnaptase is a yellowish white opaque horney mass, which is very soluble in cold water. Iodine produces in the sapnaptase a rose colour. The sapnaptase soon decomposes in solution, deposite a white precipitate, and acquires a mordant colour. It coagulates at 140°C, like albumen. It contains azote and produces ammonia. The analysis of the other parts of the compound, and the properties of this substance by Dr. R. D. Thomson, and Mr. Richardson.

**Carbon** 49.025 48.555
**Hydrogen** 7.788 7.677
**Oxygen** 47.187 47.748
**Nitrogen** 18.910 18.742

100,000 100,000

The action of sapnaptase 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 clear, without losing its transparency; acquires the odor 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 sapnaptase, and on continuing the evaporation, a sweet liquid is obtained, which contains crystallisable sugar. After destroying the sugar by fermentation, a fixed acid remains in the residue. The quantity of sugar obtained is more considerable than what the elements contained in the amygdalin produce; it would appear, therefore, that the elements of the amygdalin do not form a volatile combination, but that they form a compound which is not completely unalike the amygdalin and sapnaptase are dissolved in a proper quantity of water; if it is insufficient to dissolve the hyduret of benzoyl, corresponding quantity of amygdalin remains undecomposed. (Traité, p. 576.) The constituents of the bitter almond are the fixed oil, which is separated by expression, and the sapnaptase and amygdalin, the two last in such a condition that they cannot re-set upon each other. When the almond cake is treated with boiling alcohol, the amygdalin is dissolved out, and the sapnaptase 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 dissolved in a certain quantity of water, in order that the mutual action of the sapnaptase 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 the cake and 20 parts of lukewarm water be prepared, and 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 C₆ H₅ N O₅ 2 equiv. of hyduret of benzoyl C₆ H₄ O₅ 2 equiv. of sugar C₆ H₅ O₄ 2 equiv. of formic acid C₆ H₄ O₄ 7 equiv. of water H₂ O

1 equivalent of amygdalin C₁₄ H₂₂ O₈

One hundred parts of amygdalin are said to yield 47 parts of the crude essence of bitter almonds, and these 47 parts to contain 5 6 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 manner of time." (Gmelin.)

**Syrningsin, a non-assorted bitter principle, found in the common lilac (Syringa vulgaris).** **Tanacetine, a non-assorted vegetable principle, obtained from the Tanacetum vulgare, the common tansy.**

**Tartaric Acid**, C₄ H₆ O₆, 2 + H O, and Tartaric Acid, C₃ H₆ O₆ + 2 H O, two acids obtained from tartaric acid. By long contact with water their salts are converted into tartar and tartaric acid. **Terophammon**, C₁₀ N H₈ O₈, a compound described by Anderson. It is obtained from norticine by the action of nitric acid of moderate strength. It forms small white crystals, and is sparingly soluble in water. It presents a crimson red colour when heated with sulphuric acid.

**Thiorinnamine**, C₁₀ H₁₄ N₂ S₂. When ammonia is added to the pure oil of mustard, C₁₀ H₁₄ N₂ S₂, this substance is formed. It is crystalline, acts as a powerful base, and yields a variety of interesting compounds. (See oil.)

**Toluise = Tolene, C₆ H₅ H.** This substance, which, according to Deville, is a radical base, is contained in the Balsam of Tolu. It is homologous with benzole. When it is acted on by nitric acid, the hydrogen is replaced by nitric acid, and the molecule is resolved into the styracose and styril, crystalline, are formed. The first is a liquid, and the second is a solid. Other compounds have been produced by Deville. **Toluic acid**, C₆ H₄ O₄, corresponds with benzolic acid.

**Uracil**. [Uryl.] **Uryl, C₆ N₃ H₄ O₄, is the hypothetical base of the various compounds obtained from uric or lithic acid.** This base is also known by the name of Gomysolithic acid, as it contains the elements of 3 equivalents of oxalyl, and 2 of cyanoxy.

The following table will show the relation of this substance to the various compounds derived from uric acid:—

<table>
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<th>Uric acid</th>
<th>C₅ N₃ H₄ O₄</th>
<th>Alalwinie</th>
<th>C₅ N₃ H₄ O₄</th>
<th>Allainon</th>
<th>C₅ N₃ O₄</th>
<th>Alloxan</th>
<th>C₅ N₃ O₄</th>
<th>Algarn</th>
<th>C₅ N₃ O₄</th>
<th>Alantaric acid</th>
<th>C₅ N₃ O₄</th>
<th>Alhydrilic acid</th>
<th>C₅ N₃ O₄</th>
<th>Alnylation</th>
<th>C₅ N₃ O₄</th>
<th>Alurilie</th>
<th>C₅ N₃ O₄</th>
<th>Thionuric acid</th>
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The radical pyridone H₂ O₄, a compound radical not known in its separate state. Its hydrated pyridone vatalor or vataleryduly, is said to be one of the products of the oxidation of ammonia. It is used as a paint in the manufacture of varnish. The pyridone is a volatile hydrocyanic acid when exposed to oxidising agents. It unites with ammonia, forming a crystalline compound with ammonia. **Valerianic acid**, C₅ H₄ O₄ + 4 H O, is found in nature, in the leaves of Valeriana officinalis. It has also been found in train-oil and sperm-oil combined with the oxide of lippyl. It also occurs in various fats and oils from the animal kingdom, and in the seeds of the guelder rose (Viburnum Opulus).

**Vexor of the acida of Bileis** is a fragrant ether, and is
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found in plants, giving a peculiar scent to those which possess it. It combines with various other bases. The compounds of valeriy, as far as they are known, are homologous with those of methyl, ethyle, formyl, and acetyl.

Xyloдине, CH₃ (NO₂)₂ O, When potato starch is rubbed up with strong nitric acid, the starch is dissolved, and a viscous liquid is produced from which water precipitates the compound called xyloдине. The same compound is obtained in some of its properties from the bark of the tree, but it contains a large 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 Hand- book of Chemistry of Organic Compounds, edited by Jones and Hohmann; 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 smoother forms of Quartz to Hornstone. [Atlas.]

CHESHUNT, Herts. [Atlas.]

CHIGWELL. [Atlas.]

CHILDREN, JOHN GEORGE, was born on the 16th of May, 1777, at Ferox Hall, Tonbridge. From the grammar school of that town he went to Eton, and afterwards, in 1794, entered Queen’s College, Cambridge, as 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 his profession.

While studying mineralogy, chemistry, and galvanism, he made the acquaintance of Davy, Wollaston, and another leading men of science. In 1807 he was elected a Fellow of the Royal Society, and in 1816 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 unusually large battery plates. With twenty pairs of plates each four feet long and two feet wide, he confirmed Davy’s observation, ‘that intensity increases with the number [of plates], and the quantity of electricity with the extent of the surface.’

This was followed 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 contact of the zinc with the stone unison with diamond, under the sole action of the battery.

Between the dates of these papers Mr. Children travelled in Spain, and visited the silver mines of Almaden, then but little known in England. In 1816 he was appointed one of the natural history proceed of the Royal Society, and one of the first editors of the ‘Transactions of the Royal Society of Natural History’ of the British Museum. In 1819 he published a translation of Thénard’s ‘Essay on Chemical Analysis,’ and in 1822 of Berzelius’s ‘Treatise on the Use of the Blowpipe,’ with additional experiments and notes. He discovered a method for extracting silver from its ores without amalgamation, and derived considerable profit by selling the right to use it to several South American mining companies in 1834. He helped in establishing the ‘Zoological Society of London’ in 1830, and was one of the first editors.

In 1826 he 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, terminated by the Treaty of Nanking in September, 1843, as well as of the events which preceded the war, and the treaties by which it was followed. In 1856 a dispute occurred between the British and Chinese authorities at Canton. A small vessel, not British, which had escaped the French fleet, and bearing the British flag, was boarded by the Chinese, and twelve of the crew were seized. This led to a demand for apology, required by the British plenipotentiary, but refused by Yeh, the Chinese commissioner or governor of Canton. Hostile proceedings 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. The Chinese, however, sooner or later taking refuge in Hindustan, most of the troops sent from England were required to assist in quelling it, and the quarrel with the Chinese remained unsettled. As however the dispute was not of a nature to authorize there, especially the commissioner, Yeh, the British, attempt to settle themselves with the French, resolved to attack the fortifications of Canton. This operation was successfully performed in the morning of the 29th of December, 1857, when the principal forts of the town were captured, and Yeh’s town of the city were taken possession of. The assault was conducted by Major-General Van Straubenzee, 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 Rignaud 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, 1858, and sent to the Pechino gate.

CHINCHAS, a group of three islands in the Bight of Pisco, 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 quantities of ashes and cinders, and now they are almost covered. The islands lie nearly north and south, and are separated by channels from one mile to two miles broad. In their general formation they are all alike. On the eastern side they present a perpendicular wall of rock, from the base of which stacks of white and brown cinders (some of them from two and a half to three feet high) project, and form a pinnacled cone, the rocky inequalities of the original surface having been filled up and covered with the cinders, the cuttings of which vary in depth from a hundred feet to a few inches. Round the base of the islands little rocky peninsulas jut out, in which the washing of the ocean has formed many coves, the resort of sea-lobsters. Whales also are frequently seen boiling about the islands. The middle island has been moderately worked, but the greatest quantity of guano has been taken from the north island; the south island is still untouched. The quantity of guano on the three islands has been estimated at 250 millions of tons. Guano is also found on the Battista Islands, and upon San Galleen Island, which lie immediately south of the Chincha Islands. South of the Guano Islands are the Lobos Islands, off the north-west coast of Peru, and at various points along the coast of South America; but what is obtained from the Chincha Islands is prized above all other deposits on account of its extreme dryness. [Guano, S.2] CHICOCOCHA, a genus of plants belonging to the natural order Cichomaceae. Calyx with an oval tube, and an acutely 5-toothed permanent limb. Corolla funnel-shaped, with an obconical tube or throat, and five acute lobes. Stamens with the filaments hardly adnate to the bottom of the corolla, downy, and shorter than the anthers, which are inclosed and linear. Style rather clavate at the apex, entire or slightly 3-lobed. Berry somewhat digitiform, compressed, crowned by the teeth of the calyx, containing two sericeous seeds. Many species of C. coca (from which cocaine), a genus of plants belonging with a long superior radicle. Albumen cartilaginous. Shrub generally with a somewhat climbing habit. Leaves opposite, ovate or oblong acute, glabrous. Stipules broad at the base, permanent, more or less apiculate. Racemes axillary, opposite, simple or paniculate, from the axils of a yellowish-white colour. Roots emetic and alexiartic.

C. racemosa. Racemose Snow-Berry, has oval leaves acuminate at both ends, smooth; stipules broad at the base, the leaf persistent, the flower pedicels short, and the stamens downy. It is a native of the West Indian Islands and Carthagna, on hills. It is a very variable shrub. The corollas at first are white and scentless, but at length become yellowish and sweet-scented. The berries are snow-white, the juice sweetish, the fruit acid, the taste, and has long been used as a strong resolvent or attenuant.

C. densiflora. Dense-Flowered Snow-Berry, has ovate rather coriaceous leaves, many-flowered racemes, the corolla much
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longer than the calyx, the filaments densely-bearded. It is a native of Brazil, in woods at Almeida and Serranas, on the mountains of Bahia, and at the port of St. Catherine.

C. odorata, Sweet-Scented Snow-Berry, has broad oval leaves, rather coriaceous, very blunt, acute at the base, and running down the short petioles; peduncles axillary, solitary; 2-4-flowered. Snow-Berry has a beard of throat. It is a native of Elizabeth Island, one of the Society Islands.

C. bartata, Bearded Flowered Snow-Berry, has oval leaves, acute at the base, and tapering into short petioles, acuminate and obtuse at the apex; peduncles axillary, solitary; 1-2-flowered. It is a native of the Friendly Islands and the Society Islands.

C. javana, Java Snow-Berry, is a parasitical shrub, with oblong lanceolate leaves, acuminate at both ends, glabrous, velvety, and shining above; corysts terminal, trichotonous. This is a native of Java, on the mountains, upon trees.

All the species of Chicoceos grow best in a mixture of loam, peat, and sand, and strike freely in sand under a glass-house.

CHIRIK. [DEVONSHIRE.] CHIRK. [MONTGOMERYSHIRE.]

CHLORINE. [CHEMISTRY, S.1.]

CHLOROCINNOSAE. [CHEMISTRY, S.1.]

CHLORISMUS. [ID. (C. yunanis.)]

CHLOROPHYLL. [TUBER, ORGANIC, S.1.]

CHLOROPHYLLITAE. [MINERALOGY, S.1.]

CHLOROSALICMYDAE, CHLOROSAMYDEAE. [CHEMISTRY, S.1.]

CHLORUS. [PUBLIC HEALTH, S.2.]

CHRYSEON. [CHEMISTRY, S.1.]

CHUMLEIGH. [DEVONSHIRE.]

CHURCH BUILDING COMMISSIONERS were first appointed by the statute 66 Geo. III. c. 45 (which however was for a term of thirty years only) for building new churches in populous districts, and for dividing existing parishes, and assigning new ecclesiastical districts and determining their endowment and patronage, their recommendations being notified and carried into effect by orders in council. In this way, not only have new districts been carved out of existing parishes, and themselves considered as original parishes, but churches and chapels have in some cases been constituted the parish church, and the original parish divided among a district of several chapels of ease.

The ministers of these districts are usually denominatedincumbents, 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 by the 19th of Geo. III. c. 39, an act of 1820, it has been transferred to the Ecclesiastical Commissioners.

CINCHOVATINA. [CHEMISTRY, S.1.]

CINNAMODENDRON, a genus of plants referred to Von Martinus’s doubtful order Canellaceae. This genus has been separated from Canella, which is well represented by C. alba, a common West Indian aromatic shrub, with evergreen coriaceous obovate alternate stalked leaves, no stipules, and coryzae 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 Canella. Cinnamodendron has but one species, C. axillare. It is a Brazilian tree with aromatic properties. Its bark is used as a gum and incense. It is administered in low fever and relaxed sore throat.

CINNRYRIDE. [SUN-BRIDE.]

CLAIM IN CHANCERY. [Equity, S.2.]

COCAMAH. [SURREY.]

CLAIR, 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 became master of that trade, and several years in that city and at Colebrookdale. In 1806 he removed to the city of Liverpool 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 Middlesex 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 the power of the mill was increased to 140, and the pumping pumps were 12 sets of pumps, all without an accidental waste of water, and the largest pump could raise 190,000 gallons an hour. Under Mr. Clark’s advice, the company purchased the adjoining land, and erected a new reservoir, which can supply water to 50,000 families, and admit a water pressure of 300 feet, sufficient to reach the upper parts of the town. Mr. Clark, in 1817, built the water works of Mr. Alcock at Stockport, and in 1820, those at the Hove. Mr. Clark was born in 1776, and died in 1842. Mr. Clark was so successful in the art of building reservoirs that he was employed to construct 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 Friesbury Hills, in the Netherlands, was under his personal superintendence. It 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. Mr. Clark 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 Pesth. It was begun in 1839 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 the master of Mr. Clark, and the bridge remains an admirable monument of his genius and skill.

Mr. Clark was elected a Fellow of the Royal Society in 1857; he was a Fellow also of the Astronomical Society, and a member of the Institution of Civil Engineers. He died September 22, 1852.

CLARKSON, THOMAS, was born March 26, 1760, at Wisbeach, Cambridgeshire, where his father, who was a clergyman, was master of the free grammar school. He was at first educated under his father, and after that 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, 1785, the Vice-Chancellor of the University announced that the Council had resolved to give Mr. Clarkson, 'Anne lecit invitos in servitum dare' ('I is 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 it discontinued, and he was employed for some time on the subject of the slave-trade, and he was afterwards introduced to Mr. Wilberforce, and other persons of influence. William Penn in 1688 had denounced the trade as cruel, impolitic, and unchristian; in 1727, at a general yearly meeting of the Quakers in London, it was declared "that the importing of negroes is cruel and unjust, and is severely censured by the meeting;" and in 1760 a similar meeting passed a resolution to exclude from their society all who participated in any way in that guilty traffic." While Mr. Wilberforce, seconded by a party which gradually increased, repeatedly brought the question before the House of Commons, Mr. Clarkson was labouring without the walls of parliament, was collecting evidence, writing letters, and attending meetings at Liverpool and Bristol, then the chief centres of the trade, and at Plymouth, Bridgewater, and other places. He even went to Paris, and remained there six months in the greatest heat of the French revolution, furnishing Mirabeau with materials for speeches against the slave trade, which were delivered to the French Convention, but without producing the desired effect. In England, however, after more than twenty years of incessant exertion, the cause was won: a law for the entire abolition of the trade in slaves was passed March 25, 1807, Mr. Wilberforce having first brought the subject before parliament in 1779.

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
of slavery in the British West India Islands. In 1833 their efforts were again crowned with success, by the passing of the Emancipation Act, which effectually emancipated the slaves, and awarded twenty millions of pounds sterling as compensation to their late owners. Declining health had prevented Clarkson from appearing in public during the latter years of the movement. Catarrh had formed in both of his eyes, and for a short time he was quite blind. He underwent an operation which completely restored his sight, and in 1840 he made his last public appearance at a meeting of the Anti-Slavery Convention at Exeter Hall, over which the Duke of Wellington presided. The meeting was unanimously acknowledged, and he was enthusiastically greeted as the patriarch of the cause. He died at his residence, Playford Hall, Sussex, September 26, 1846, at the age of eighty-four.

Besides several pamphlets and other small works, all bearing more or less directly on the one great object to which he had devoted his life, Mr. Clarkson published, in 1806, 'A Portraiture of Quakerism,' 3 vols. 8vo; in 1808, 'The History of the Abolition of the Slave Trade,' 2 vols. 8vo; in 1818, 'Memoirs of the Public and Private Life of William Penn,' 2 vols. 8vo; and in 1836, 'Researches, Antediluvian, Patriarchal, and Historical,' 8vo.

(Thomas Taylor, Biographical Sketch of Thomas Clarkson; Geddes, Memoir of Unwin.}

CLARY. [Galv.]

CLAY, HENRY, was born in Hanover county, Virginia, April 12, 1777. He was the seventh son of a clergyman, who had been a member of the society. Clay was very young, leaving his wife and family but something to run the school of a 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, so that although he was nineteen years of age when he formally commenced the study of the law, he was only twice admitted to practice 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 profession. He accordingly 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 doubted 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 advancement. The people of Kentucky no doubt saw in him a man fit for the state of Kentucky soon afforded him the opportunity he desired of taking a prominent part in political movements. His advocacy of a provision for the gradual abolition of slavery entailed on him some temporary unpopularity, but his subsequent course of events showed the people of Kentucky were regarded as an encroachment on the part of the central government, and he was at the next election (1803) returned to the state legislature.

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, he was elected by it to the chairmanship. The remarkable honour 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 members with their choice, that he was five times re-elected speaker. During this period he took 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 pretensions. It was the war of 1812, and the efforts of the commissioners to negotiate the treaty of peace. On his return to America he was at once re-elected to Congress.
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 things.

CLINKSTONE, a grayish blue rock, consisting principally of Felspar. It passes gradually into gray basalt, but is distinguished from that rock by its lower specific gravity. When weathered it becomes a sage like stone, and is frequent in volcanic districts. It is also called Phonolite.

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 Wykeham, and was educated at St. John's College, Cambridge, 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, 1811, to resume the ancient family name of Clinton.

Mr. Clinton was educated at Southwell School, Nottinghamshire, where he remained from 1769 till 1796, and was well grounded in the classical language. In September 1796 he was removed to Westminster School, where he remained till Easter 1798, not on the foundation. In April 1799 he went to Oxford, where he was entered a commoner of Christ Church, and remained till 1806. He graduated B.A. in 1803, and M.A. in 1805.

At the general election of 1806 he was returned M.P. for Aylesbury, and was elected to the chair of the Duke of Newcastle, 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 Whig. He died, the death of Dr. Planta, in December 1857, he was a candidate for the office of principal librarian of the British Museum; but the claims of Sir Henry Ellis from long service and experience determined the choice of the Marquis of Lansdowne, then Home Secretary, in his favour. Mr. Clinton inherited an ample fortune from a distant relative. He died at his residence, Welwyn, Hertfordshire, October 24, 1852.

Mr. Clinton married June 22, 1809, but his wife died February 1810. He married January 6, 1813, a daughter of Dr. Majendie, bishop of Bangor, who survived him, together with eight daughters. His only son, Charles Francis Clinton, graduated B.A. of Christ Church, Oxford, in 1836, served in Spain in the Christino army, was decorated with the Cross of San Fernando by Espartero, was appointed in 1843 British ambassador under the treaty with Portugal for the abolition of slavery, and died at Leonde, on the west coast of Africa, in 1844.

Mr. Clinton was, in his time, 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 5223 pages of the Greek poets and historians. But a few days after his graduation in 1803, he read about 40,000 pages: he used to read 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 and Constantinople,' 2 vols. 4to, Oxford, 1818-1820) was published in 1818, and was published in four separate volumes in 1824, 1827, 1830, and 1834; but the work is now divided into 3vols., which are sold separately—vol. i. extending from the earliest accounts to the 5th Olympiad, vol. ii. from the 5th to the 24th Olympiad, and vol. iii. from the 24th to the 41st classical Olympiads, 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 different periods of the early history, the Ephesus chronicle, the writings of Homer, the population of ancient Greece, and other interesting subjects. The 'Fasti Romani' (the 'Civil and Literary Chronology of Rome and Constantinople, from the Death of Augustus to the Death of Heracleus'), 2 vols. 4to, Oxford, 1836, was published in 1836, and in 1838 and 1839. It was published as '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 Hercules,' 8vo, Oxford; two abridgments which are very useful to those students who cannot afford to purchase the larger and more expensive works.

(Clownes, [Magazine.])

CLOWES, WILLIAM, printer, was born at Chichester, January 14, 1738, and January 23, 1814. He was apprenticed to Mr. Clowes was educated at Oxford, and kept a large school at Chichester; but he died when the subject of this notice was an infant, leaving his widow to support two children with strained means. She was enabled, by keeping a small printing-office for the lyceum and the school, to support herself and 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 £300. He purchased one press, engaged one comestant; and, after working as a compositor through the day, would often, for two or three consecutive nights, till press, to have his stock of type free for the next day's demand. It was this energy of character that raised Mr. Clowes to his subsequent eminence. Fortune favoured his exertions. He married when he was at the age of twenty-four, a cousin of Mr. Winchester, a stationer, who had much government business; and by him he was recommended for important official work. He was appointed printer to the new government, and brought friends around him; and in a few years the humble beginner with one press had a considerable printing-office in Northumberland Court, Strand. This office was burnt down; but a larger rose in its place. In 1823 he commenced business in Fetter-lane, where his press was in a dark cell: and, the process being novel, his office had many visitors of literary reputation. Mr. Clowes was always a signal example for the honest arbour of manufacturing enterprise to lead the way under new circumstances. In 1829 the newspapers were printed by steam; and he estimated 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 successfully defended; but the printer removed his noise and his dirt, under the award of arbitrators; and the decision was a fortunate and timely precedent, as it became the occupier of the spacious and well-known premises 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 employment to 300 workmen, the most efficient, most economical, and well-ordered printing manufactory that had ever existed in the world. The creation of literature that should at once reconcile the apparently dissimilar qualities of goodness and cheapness, through a demand for books before unprecedented, gave a decided and permanent stamp to the book trade. It was published as 'The Penny Cyclopedia' and 'The Penny Cyclopaedia' issued with undeviating regularity for fourteen years from his printing-office. Mr. Clowes was not 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 banker's gold, would not hesitate, in 1850, to print a roll or monthly paper, requiring 800,000 pounds sterling, give employment to 2000 workmen, and lock 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 highest class of literary publishing; 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 had ever before been known. He was the first to be permanently associated with the intellectual development of our time. (National Cyclopaedia.)

CLOUGH, a name given to the lower and harder beds of the Cretaceous Rocks. They are occasionally used for the manufacturing of flints and glass, and as a manure. There is internal work in cathedrals and other large public buildings. This material stands well if not exposed to accidents from mechanical violence. (Annoted, Elementary Geology.)
it leaves an ash which consists of varying quantities of silica, alumina, and oxides of iron. The carbon and hydrogen are often found chemically united to form bisulfurous 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 odor. Those kinds of bituminous coals are known as having a pale blue flame, due to carbonic oxide, which is formed in these coals through the decomposition of the water present.

The following table, founded on Mr. Muschet's Analysis of Coal, is taken from Professor Ansted's 'Elementary Course of Geology, Mineralogy, and Physical Geography':

**Analysis of various kinds of Coal.**

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The following analyses of the Torbane-Hill Mineral and Cannal Coal were presented by Dr. Fyfe at the trial in Edinburgh:

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The Torbane mineral is only remarkable among other coals for the large quantity of sulphur it contains.

A large series of coals, more especially Welsh, has been submitted to chemical examination by order of the government; and the following table is taken from the 'Report on the Coals suited to the Steam Navy,' by Sir Henry De la Beche and Dr. Lyon Playfair, in the second volume of the 'Memoirs of the Geological Survey of Great Britain':

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for making inkstands, snuff-boxes, and other articles of use.

The above coals are those most commonly burned.

Common Scotch Bituminous Coal. 6 lb.
Carr's West Hartley Main (Newcastle). 6 lb.
Merthyr Bituminous Coal. 6 lb.
Pare Welch Anthracite. 6 lb.

Brown Coal, Wood Coal, Lignite, are names given to less perfect varieties than the last. Specimens of these coals have a brownish-black colour, and burn with an empyreumatic odour.

On placing 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. Power and Quetke, in their account of the formation of coal, have indicated the term lignite to those mineral substances which are evidently made up of the woody tissue of plants. He maintained that the Torbane mineral was not coal, on the ground that it was not composed of the debris of remains of vegetable tissues. Although woody and vascular tissue can be seen in the Torbane mineral, Professor Quetke maintains that this has been accidentally introduced, and that no true vascular or spiral tissue is found in coal.

Dyestill is a yellow or grayish highly laminated substance, often found with lignite, and burning vividly, and spreading an odour of asafetida." (Anecd.)

Jet is another variety of coal belonging to the bituminous sub-class, occurring in various uniform 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 operable by various cutters and hammers. It is known as jet. It is found in Saxony, and also in the Prussian amber mines in detached fragments. It is sometimes washed up on the shores of Great Britain. The finer sorts are used in the manufacture of ornaments and trinkets of various kinds. The coarser sorts are burnt as fuel. It is found when burning a greenish flame and a strong bituminous smell, and leaves a yellowish ash. It contains about 37% per cent. of vol. tile 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.

**COC**
for reconciling Spain and her transatlantic colonies. He was conspicuous in the hostilities in America in 1813 and 1814, and was present, as a member of the legislative council of the navy, at the Battle of the Nile, July 1, 1798, and the Battle of Trafalgar. For his services in this victory he was rewarded by a gold medal. He was appointed, in 1805, a captain of the Orinoco, and, in 1806, to the command of the Blake, 74, in which ship he sailed under Lord Gardner in the expedition to Walcheren, and was thanked for his services in forcing the Scilde, in August 1809. In 1810, 1811, and 1812, Captain Codrington was employed in 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 Cochrane. He took part in the attack on New Orleans. At the conclusion of the war with the United States he returned to England, and was placed in the commands 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 destinied to observe the Turkish Mediterranean 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 23, 1827; when the Turco-Egyptian fleet, consisting of 61 ships, was completely and almost entirely destroyed. For his services he was appointed an "unequivocal" baronet, with the dignity of knight grand cross of the Bath; but as there was much doubt among politicians as to the propriety of destroying this fleet, and the Duke of Wellington admitted that it was not a "Sir Edward Codrington's piece of work, the achievement was in a manner veiled from the Mediterranean in April 1828. In 1833 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 1827 he attained the full rank of admiral, and on the 22d of November 1839, was appointed first vice-admiral, and commanded the Mediterranean fleet. He was an active friend of the anti-slave-trade movement, and was its strongest advocate in the House of Commons.

CELEBOYNE, 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 the blossoms, which are pinnate, have ripened their fruit and produced seeds containing a perfect embryo without the presence of the staminate flowers. This appears to be quite an exceptional case to the law of production of the embryo by the agency of the female or staminipetalous flower. Further observation may detect some hitherto undiscovered means by which the pollen-cells of perhaps a allied plant may come in contact with the pistil of the Celebogyne.

COGGESHALL [Essex].

COBLY, THOMAS, Major-General in the army, and one of the Directors of the Ordnance Survey, was born at Rochester, Ist of September 1784. When his father, Captain Cobly, 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 lieutenant 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 ordnance survey, he was appointed one of the assistants in that great work. Entering at once on his duties, he justified the expectations formed of him, by the intelligence and conscientious 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 suffered at the same time a fracture of the first and third fingers, which he traces to the accident of a fragment of the barrel, that he felt the effects of the accident for the rest of his life whenever he attempted any long-continued mental exertion. Though the loss of his hand and the loss of his flag-ship, the loss of the Hibernia, which Captain Mudge was so well satisfied of his merits, that he kept the young lieutenant permanently attached to the survey.

In 1805 Lieutenant Cobly was observing at Dunmore, one of the prominent points of the survey: in 1804 at Beaumaris; and in 1806 with the seigneur sector at Burleigh Moor and Delamere Forest. The winter months he passed in the
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'Drawing Room' at the Tower, computing and preparing the results for publication, and superintending the construction of the ordnance maps on a scale of ten feet 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 Accurate Description of the British and Irish Coast' 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 of Scotland, a work which called out in an especial manner the energies for which Captain 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 the principal observatories. The surveying, levelling and other work 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 with great success. In his account of the Season on 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 the stars of the heavens. And then 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 captain taking two or three of the junior officers and a few men without starting on a trip, would start on a course by 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 building up the great pile of stones by which it was to be distinguished from all other points. Some of the times the resting-place at night would be a miserable hovel where no other food was to be obtained than the national porridge; at others the weary explorers rested under a ducal roof, or at the base of the mountain during the hot months they were tormented and blistered by the unbearable midges.

In one trip in 1819 the party walked 586 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 kindness of disposition were not less apparent in camp than on the station-hunts. He would settle 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 as to make himself contemptible. On one occasion, when I was on leave, he 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 curiosity when busy with observations for which he had long waited the opportunity. Once, while encamped on Slieve 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. "Oh! Colby," exclaimed one of his officers, "now is the time for observing, which would have been a geodetical triumph, as 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 eruption escaped his lips, but not again succeed, and the object was therefore lost, he never afterwards alluded to the subject."

He was one of the party that accompanied Biot on his trip to Shetland in 1817, when, in compliance with the request of the friends of their country. Wharram, 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 climbed to the summit of Uist selected by Colby afterwards assisted in connecting the French with the English triangulation by the observations across the straits of Dovers.

In 1829 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 lieutenant-colonel, and received a grant of a hundred and forty acres of land near his beloved home, the county 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 ably combined that one party was usually 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 methods of levelling; the level was not made to correspond 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. Poorer and more uninteresting works, the Irish census, have all been based upon them. They are comprised in 1839 sheets.

In 1835 Major Colby became lieutenant-colonel, and in that year he obtained the Duke of Wellington's sanction for raising and training three companies of provers and masons 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 made the acquaintance of Joseph 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, for determining the position of ships lying in ports, and in those required for the great arc of the meridian in 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, when he relinquished the service his connection with it by the science of surveying and trigonometry. His 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 second of the national atlases was marked on the margins, and he co-operated with Sir Henry De la Beche in introducing the geological 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."

"All his scientific career General Colby never sacrificed duty to selfish considerations; and his rare administrative abilities, and sound judgment combined with high principle, enabled him to accomplish well all that he undertook. He had resources ready for every emergency, and his perseverance triumphed over all obstacles. He died in Liverpool on the 9th of October 1862, leaving a widow and seven children. He was a fellow of the chief scientific societies of London, Edinburgh, and Dublin; LL.D. of Aberdeen, and a knight of the post-town of Coleseraine; a sea-port and post-town, a municipal

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COLEMAN, county of Londonderry, Ireland; partly in the parish of Coleseraine. It is about a mile from the barony of Coleseraine, situated in the parish of Coleseraine and Coleraine, and is at the north-east liberties of Coleseraine; a sea-port and post-town, a municipal
and parliamentary borough, and the seat of a Poor-Law Union, is distant 145 miles N. from Dublin. The population in 1851 was 6990, exclusive of 242 inmates of the Union workhouse. The town was an early-day-drug centre and market to the Imperial Parliament. The paviing, 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 115,970 acres, of which 12,160 acres are watered.

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 watered by the Bann and its various suburbs. The suburbs of Killowen or Waterside on the left bank of the River Bann is a stone structure of three arches, 288 feet long and 32 feet in breadth, erected at a cost of 14,000l. There is a great thoroughfare in this road to Portrush and other parts of the north of Ireland, the road to Antrim and Londonderry. The parochial churches of Killowen 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 500 tons burden can accommodate a passenger. The trade of Cokeraine is conducted from the harbour of Portrush 5 miles distant on the coast near the embouchure of the river. At Portrush is a harbour formed by two piers of 600 feet each and a breakwater 2000 feet long, with a breadth of 300 feet at low water, with an area of 4 acres, with from 15 feet to 20 feet of water at the wharves. The customs duties of the Cokeraine district in 1856 amounted to 40,000l.; the excise duties amounted to 40,644l. The number and tonnage of vessels belonging to the port in 1856 were ten vessels of 233 tons aggregate burden. The entries and clearances at the port in the coasting and cross-channel trade in 1856 were:—Sailing vessels, inwards 120, tonnage 6000; outwards 44, tonnage 1365: steam vessels, inwards 121, tonnage 24,906; outwards 51, tonnage 1,125. The total number of passengers in 1856 was 5619, 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 annual sales of linens are estimated at 600,000l. 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.

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 found 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 Uachtred, 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 116ls. 9s. 4d. The neighbourhood is 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 interpolation of the environs.

CORDERIE and PARTLY, in 1619, the eldest son of Samuel Taylor Coleridge, was born at Cledenon, near Bristol, Sept. 19th, 1796. Two sons of his father are commemorative of his birth; and an exquisite poem of Wordsworth, 'The Cauterizing potions' appear in this number of the West--"whose fancies from afar are brought." His infancy is also 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 day-dreams which afterwards formed the first part of the "Christabel." In 1808 he was placed, as also his brother Derwent, as day-scholar of the Rev. John Dawes, at Ambleside. As a school-boy his powers as a story-teller were unique; his imitations were original and ingenious; his imagination was enormous; his work was night after night for a space of years. During their school-days, the boys had constant intercourse with Mr. Wordsworth and his family; and Hartley made the acquaintance of Professor Wilson, who was his friend through life. His friendship with the Wordsworths continued "—by the living voice of Coleridge, Soutey, and Wordsworth, Lloyd, Wilson, and De Quincey." In 1814 Hartley left school; and in 1815 went to Oxford, as a scholar of Merton College. His extraordinary powers as a converser, and his numerous invitations to wine-parties, were injurious 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 1816; he then studied for 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 his imprudence in his conversation and habits. He had 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. He never got back to college life, with a manly and touching sincerity says, 'As too often happens, 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 unlooked-for—his mother's 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 on his incompetence of control, and a belief that he was watched by those with whom he was destined to have the most unintelligible manifestations of his peculiar temperament. His qualification for future active exertion was irrevocably destroyed. After leaving Oxford, Hartley Coleridge remained in London two years, occasionally writing in the 'London Magazine,' in which some of his sonnets first appeared. Against his will he was 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 unfit for was abandoned. Three years of life from that time were spent in the Lake district—idle, 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 1833 to 1836—he resided at Ambleside; and again, in 1838 and 1839 he resided with Mr. Bingley, a youngprinter and 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 codicil 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 1846, and an annuity was then purchased on Hartley's life. Meanwhile, he lived with his humble family, first at Grasmere, and then at Hydal Water, washed over by the kind people with whom he was an in-mate, 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 verse his father had been almost prophet. 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 appeared in the 'Leeds Intelligencer,' and in a 'Memorial of His Life,' in 1851. Hartley Coleridge died in the cottage which he had long occupied on the bank of Hydal Water, on the 6th of January 1849; and was buried in Grasmere churchyard. His grave is by the side of that of Wordsworth.

COLERIDGE, SARAH, the only daughter of Samuel Taylor Coleridge, was born at Ambleside, on the 7th of August 1811. She was educated with her four sisters, at Miss dood in Grasmere, and Miss Lea in nearby Ambleside. She later attended a private school in London, where she met her future husband, Henry Hartley. She returned to Ambleside with her husband after his death in 1849. She was a member of the literary circle that included Samuel Taylor Coleridge, Robert Southey, and William Wordsworth. She contributed to the 'Leeds Intelligencer' and had a personal correspondence with Thomas Carlyle. She died in 1895 and is buried in Ambleside churchyard.
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Coleridge was born at Keswick in 1803. Until her marriage as a result of the influence of Robert Southey, who married her mother's sister. To his influence must be ascribed the formation of her mental character must be largely ascribed, though she possessed in a remarkable measure the intellectual characteris- tics of her father. Her opening womanhood was spent at Keswick in the delightful scenery and exercise of her remarkable powers. She readily lent her assistance to Southey in lightening as far as she could his literary labours: she often accompanied Wordsworth in his mountain rambles. In 1822 she had completed her first literary work, 'An Account of the Aborigines of New South Wales,' prefixed to the Latin of Martin Dohrzesoff, a translation suggested by Southey, and the admirable execution of which he has commemorated in a stanza of his 'Tales of Paraguay.' In 1829 she married her cousin, Henry Nelson Coleridge. [Corrections]

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 much of the poet's unpublished works as would best exhibit him to a theologian, philanthropist, poet, and critic, and Sara Coleridge must have devoted herself to this pious labour. During her husband's life much of the collaboration 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' (withматеаты), and 'Dramatic Crichtons' (with 'The Times' were edited by her alone, and to some of them were affixed elaborate discourse on the most weighty matters in theology, morals, and philosophy, which were discussed in a cheerful and amiable manner. Her husband, a close observer of human nature, a kind of erudition quite remarkable in one of her sex. But 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 employed him to rank among poets 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 was on her contemplations upon her father's work 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 annotation, were not likely to be lost, on account of the very high order. Sara Coleridge survived her husband ten years. She died May 3rd, 1882. 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 S. T. Coleridge. A Life of S. and S. Coleridge,' 1822.

COLESHEL. [WARWICKSHIRE]

Collins, William, R.A., was born in Great Titchfield-street, London, September 18, 1767. 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 neither 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 1827 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 R.A. was in 1807, when he contributed two small 'Views on Millbank,' from that time till the age 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 1813 threw upon the young painter serious responsibilities, which drove him on increased exertions. For some time he was forced 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 country amusements; but it was not till five years later when he exhibited an election as associate of the Academy, which took place in 1814, that he struck into that path—the representation of coast scenery—which perhaps most surely led him to fame and fortune. From that time—indeed, for some or four years previous—Collins never waited for an opening, but placed his groups from first to last was of moderate but 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, that was characteristic of country life, and failed to depict them in their most natural and unrestrained guise. Swinging on a gate, 'happy as a king;' gazing with unbounded admiration at the newly born pony;/editing the 'stay kitten;' outwitted by the sly rabbit just at the moment when his bow and arrow were about to fail 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 his choice of subjects, and his 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 the rich hue of his brush from the sky, sea, and land, were powerful representations of a land. They show that there was something which really interested and pleased the painter, and as a consequence the spectator is himself also interested and pleased. But their technical quality is of a very high order. Collins had an excellent eye for form, chiaroscuro, and colour. From the first he painted always with the greatest conscientiousness. He never slighted any part of his work, and always did his best; and hence his course exhibited continual progress. In his earlier works he was more bold, and the more bold 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 no correctness of detail is not finish. And then with his technical and manipulative skill there was a close study of nature. The receding or advancing wave, the moist or parched sand, the whiteness of the clouds, the brightness of the sun, the redness of the sunbeam, the blue of the sea, and sky, were faithfully observed and unobtrusively represented. No wonder that a country like this, where every one can turn to the scenery of nature with never tiring zest, such faithful transcripts of a commoner aspect, until he had none like it. The blue of the sky, 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 nature 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 groups of young lazaroni playing the game of 'arrogasie; the other with 'Poor Travellers at the door of a Cappelline 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 that of historical painting. With increasing years, his brush became more stately, and the expression of his devotional feelings, and he not unusually felt a strong desire to represent in his own way the scenes on which his imagination loved to dwell. 'Our Saviour with the Doctors,' 'The Dying Child,' 'The Tempest,' 'The Two Disciples at Emmaus' in 1841. They of course attracted attention, and supplied a topic of conversacon in art circles, nor did they fail of purchasers; but it was felt to be a positive relief by the great body of the painter's admirers when, after a little coyling, a more open scenery in one or two small pictures exhibited in 1843, he
reappeared with all his old freshness and vigour in 1843 and succeeding years, with his "Windy Days," "Cromer Sands," and "Fawn Fishers," and "Cottage Doors," and the life; and never did Collins enjoy more general popularity as a painter than in these last three or four years of his life.

Collins's journey to Italy not only led him to waste on unconsumable subjects several of the best years of his life, but during it he laid the foundation of the disease which shortly afterwards led to his early death. New Moral Mansions, the book that at first he thought the heart declared itself in a decided form; but from that time he obtained only temporary relief from its distressing symptoms, though he laboured on at his calling with unaltered industry, and almost to the last with little perceptible loss of power. He died at his house, Devonport-street, Hyde Park Gardens, on the 2nd December 1847, at his house, Devonport-street, Hyde Park Gardens.

Collins was elected R.A. in 1820; in 1840 he was appointed librarian to the Academy, but resigned it on finding that its duties required a greater devotion of time than he could afford to give to it. Collins was, as we have already noticed, fortunate in early finding friendly and liberal patrons. As early as 1818 one of his Norfolk coast scenes obtained a place in the Royal Collection, and George IV. subsequently commissioned a companion to it—"Fawn Fishers at Hastings." Yet, though so much in request, the painter never obtained any of those extravagant sums for his works which we sometimes find popular painters demanding. The largest sum he ever received for a picture was 500 guineas, from Sir Robert Peel, for his picture of the "Pepper Pot," and the portraits of his countrymen 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 characteristic and original painters of the school. The Vernon collection to a certain extent supplies the deficiency: there may be seen an excellent example of his delineations of rustic enjoyment in "Happy as a King," painted in 1836; one of his pleasant coast-scenes, in "The Shrimpers—Evening," painted in 1837; and his "Fisherman's Widow," painted in 1835. Mr. Collins married in 1822 the daughter of Mr. Geddes, A.R.A., and sister of Mrs. Carpenter, the well-known portrait-painter, and by her had two sons. COMBE, LAKESHIRE. COLOMBO, COLOMBINA, a genus of Plants belonging to the natural order Rhanaeaceae. It has a spreading 5-cleft calyx; petals 5, obovate-convolute; stigma 3. Fruit capsular, dehiscient, tricosous, girded at the base by the calyx. The seeds are furnished with a short stalk. The species are shrubs with alternate, entire, or crenulated leaves, netted with distasteful-nervous, smooth but usually pubescent or rusty villous. The flowers are in axillary short crowded cymes, or panicles. C. tormentosum, 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, native of South America. In Argentina there are several which retain their name, but none are known, and are not worth cultivation except in general collections.

COLUMBITE. [COLUMBIUM.]

COLUMTRY. [DIOPSIDE.]

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 respectable tradesman, 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, graduated as B.Ch. in 1811, and as M.D. in 1813, he entered practice in Edinburgh in 1823. A pulmonary complaint under which he had laboured since 1811, and which obliged him to make frequent journeys into warmer climates, proved fatal to him. In 1815 he practised as a physician as he might otherwise have been fitted for. In 1836 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 become a convert to it; and before he had quitted his profession he continued to advocate its doctrines through the "Phrenological 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 Mental Derangements," 12mo, Edinburgh 1831; 'The Principles of Physiology applied to the preservation of health, and to the improvement of physical and mental Education,' 8vo, Edinburgh, 1834—a work which has been highly appreciated, and has gone through sixteen separate editions; 'The Physiology of Digestion considered with relation to the Principles of Dietetics,' Edinburgh, 1836, also a most popular and useful work; 'A Treatise on the Physiological and Medical Aspects of Mental Fatigue,' Edinburgh, 1840, eight editions of which have been sold. These works were written by Dr. Combe in the intervals during which he enjoyed comparative freedom from the malady which he knew was to carry him away. The last years of his life were spent by him as a recluse, either shut up in his room in Edinburgh, or seeking health by continued travelling and sea-voyages. In 1843 he was in Madeira. The mildness of his demeanour during his long illness, and the seal with which he continued to forward his scheme of benevolence which accorded with his sense of what was right and expedient, obtained him the peculiar regard of all who knew him. His death, long expected, took place on the 9th of August 1847. An interesting and affectionate account of his 'Life and Correspondence' was published in 1850 by his brother George.

COMBE MARTIN. [DIOPSIDE.]

COMPOUND RADICLE. [CHEMISTRY, S. 8.]

COMTE, AUGUSTE, a French philosopher, whose peculiar system of views has been put forth by himself, and is generally known by the name of "Positive 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 lyceums, he gave early evidence of the kind of mind, but also of a dissatisfaction with the existing methods of knowledge and the existing forms of society, and a belief that he was destined to play the part of a Bacon in the 19th century, and initiate a new philosophical revolution. It is characteristic of the Comte and the Fenian movement between the fifth and sixtieth year, drew around him, as by a kind of magnetic fascination, 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 his system of views some degree of originality and distinction in one way or another in the subsequent history of France. Of these Comte was the youngest—the Benjamin, as he was called, of the Saint-Simonian school. In 1830 the Saint-Simonian order was suppressed; and when, about 1830, the school put forth one of their prophetic proclamations, an 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 has expanded 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 become destructive of the doctrine itself until when Comte broke off from the little band of Saint-Simonians—including Enfantin, Bazard, Rodrigues, and Augustin Thierry—who remained faithful to the views of their master, and set about forming an organisation for their further propagation. Comte subsequently spoke disparagingly of 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 the course of the subsequent works and the cardinal speculations promulgated by Saint-Simon when alive, that, unless we can suppose that the pupil prompted the master to a greater extent than usual, is more than likely to have been the cause of M. Comte's a certain appearance of ingratitude in his 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 propound the philosophy with U?"
which his name is associated. Supporting himself by teaching mathematics—in which capacity he was professor at the École 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 some of his pupils—and during the last seven and twenty years a series of works, all devoted to the elucidation of his 'Positive Philosophy,' and in which those who have no sympathy with that system in its principles and extent, or who are able to recognize great power of intellect, and extraordinary fertility of generalisation on all subjects,

First, published at intervals in six large volumes, between 1830 and 1849, came out his greatest work, entitled 'Cours de Philosophie Positive.' In this work he established 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 suggestion of the agency of supernatural beings to produce them; the metaphysical stage, in which, while living supernatural beings are got rid of, certain abstract ideas, such as those involved in the words 'Nature,' 'Harmony,' and the like, take the place; and finally the positive stage, in which everything is accounted for; and the positive stage, in which, shaking off both 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 provided with faculties sufficient to this end, and with an inclination to apply this view to the entire system of human knowledge.

That all men knows, or can know, he says, consists of certain sciences which may be arranged in a hierarchical order as follows, according to the increasing complexity and 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 addition the motions of the celestial bodies, such as the planets, moons, comets, &c., as they are seen as mutually acting masses; 3rd, General Physics, which takes for granted 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 concerned more immediately with the phenomena of nervous and brain-function), undertaking the farther study of individual organised beings; and 6th, Sociology or the Social Science, investigating, as the most complex phenomena of all, the social organization of man, i.e. the State and its laws. Of these first five sciences Comte gives prominence to the last.

In 1843 only, the first four of these sciences have been even partially emancipated from the theological and metaphysical stage, but pursued positively; but the time had come when the extension of the true positive or scientific spirit has come to all, and consequently for the expulsion of theology and metaphysics from the universe. As the apostle of this great speculative change he first reviewed the various sciences up to the last and chief one, which, by a gross but convenient generalisation, he called Sociology, giving in fact a series of treatises in which the generalities of mathematics, astronomy, general physics, chemistry, and biology, are lucidly expounded, and then proceeds to stress his strength, in the last three volumes, for Sociology. Here he makes his plea for a complete conquest of the realm of the human and against the anarchy of all existing politics, attempts to lay down the basis of a true or positive politics, such as states will ultimately be governed by, when the positive millennium shall have come. Apart from the main purpose, this portion of the work abounds with striking thoughts and propositions of wide application.

In 1848 M. Comte published a small mathematical work entitled 'Traité Elémentaire de Géométrie Analytique à deux ou trois dimensions,' followed a long afterwards by a popular treatise on astronomy, which has been highly admired; and in 1844 he published 'Discours sur l'Esprit Positif,' enforcing popularly the ideas of his larger work. With this, however, he made the fatal 'cerebral crisis' of his life—not this time of the 'cerebral kid' but of the sentimental—worked a change in his views. A virtuous affection, to which he makes frequent allusion in subsequent autobiographic passages in his philosophy, 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 modifying the main principles of his system, but not by calling back either cashiered theology or cashiered metaphysics into the universe, but by supplementing positivism with the necessary effusion from the heart. In fact, during the last four years of his life he worked on a new system, a kind of a new religion, consistent 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 'Traité d'Ethique Positiviste' and 'Traité de la Philosophie 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'Humanité: Cale- drier Positiviste, ou Système 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 religion, and to whom he denominated subordinate men, and for each day minor celebrations it (it was singular to the reader to note how many Frenchmen there were among these gods and goddesses) and also arranged some of the formalities of the worship. In these works he also published the programme of an Exposition de la Religion Universelle en onzo Entretiens Systematiques entre une Femme et un Prêtre de l'Humanité.' M. Comte himself giving in the meantime practical effect to his views by assuming the office and title of 'Chief of the Societies of the new religion.' The character of this work is not open to question, but it is not generally admitted that he could ordain 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 further information respecting the life and views of this very extraordinary personage, 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 the Social Science, translated by Miss Harriet Martineau's 'Positive Philosophy of Auguste Comte freely translated and condensed' (5 vols. 1853.) Comte's 'Philosophy of Mathematics,' translated 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.

CONDAMNEA, a genus of Plants belonging to the natural order Convolvulaceae. It has a campanulate calyx, stamens and pistil united, and the corolla funnelform, with a somewhat curved tube, which is a little longer than the calyx, a dilated throat, and 6-parted limb; the filaments inserted above the middle of the tube and near the throat; anthers oblong, linear, bifid at the base, length of corolla 2-3 times the limb, opening in the middle of the cells. Seeds numerous, very small, wedge-shaped. The species are American shrubs, with 2-parted acuminate stipites and terminal many-flowered cymes.

C. corombose is a native of the hills and ravines of the Peruvian Andes. It has ovate-oblong leaves, acuminate, cordate, sessile, plicated, coriaceous; coryzae large, bractiaceous, trichome; corolla purple externally, with the throat crimson; seeds numerous, very small, smooth. The bark is fibrous. The bark gatherers of Peru are said to use this plant for adulterating samples of Convolvulus. Its bark is only slightly bitter, and may be easily recognised by its being white inside, rather bitter, and viscid. C. corombose is a native of South America, and is used occasionally as a dye.

CONĐER, 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 'Athensium,' a monthly magazine edited by Dr. Alkin; and in 1810, in conjunction with a few friends, a volume of poems 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 and proprietor, and in 1818 he left business in London for 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 dispensed by the products of his press, which were many. He also in 1818 appeared two volumes 'On Protestant Non-Conformity.' In 1814 'The Modern Traveller' was commenced: it extended to thirty-three volumes, nearly the whole of which were compiled by Mr. Corry and all 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 greatest only.

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 affairs. He took an active part in the public proceedings of the Dissenters, attending their meetings, and affording them the assistance of his counsel. 'The Patriot,' under Mr. Conder's management, became the organ of what may be termed in politics the Wing section of the Dissenters, as opposed to the Radical section; while in ecclesiastical affairs it represented the Congregationalists and Baptists. For twenty-three years Mr. Conder fulfilled the duties of his office with exemplary care, industry, and liberality; producing also occasionally works of influence, such as 'Discussions on Analytical and Comparative Views of All Religion,' 'The History of Hymns with Pictures,' &c., and several pamphlets on stirring topics of the day.

Mr. Conder married in 1815 Jane 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.

CONFEDERATION, ARGENTINE. [Plata, Lo., States of]

CONIA. [Chemistry, S. 1.]

CONIONA. [Chemistry, S. 1.]

CONOPS. [Chemistry, S. 1.]

All the Courts of Science, Courts of Requests, and other similar tribunals were abolished in 1846, by the statute 9 & 10 Vict. c. 95, on the creation of the new County Courts. [Courts, S. 2.]

CONOPS, a genus of Insects belonging to the order Diptera, family Conopidae. The family Conopidae is thus characterized:—Protoposis distinct, last joints of antennae forming a short style. Wings perfect. Cubital vein simple; brachial veins without spurious vein; axillary lobe rounded. Halteres uncovered.

The genus Conops has the following characters:—Body of middle size, rather slender, generally adorned with yellow or red bands. Head thick, vestigial, the crown especially, with a transverse vestigial tubercle; front broad in both sexes, and with a transverse vestigial tubercle. Mouth long, porrect, stilt, clavate, horizontal, or somewhat raised into a curve, geniculate at the base, arcade above, hollow beneath, obliquely notched at the tip, much shorter than the labium. Labium slender, filiform, transparent. Palpi unarticulate, short, very small, fringed at the tips with fine bristles. Labium obliquely procere, cylindrical, twice the length of the hind, narrower towards the tip, most slender in the male, blibed, slightly hairy, and with three shallow transverse impressions. Hind tibia, with a subapical head, porrect, seated on a tubercle, approximate at the base, diverging thence; first joint short, cylindrical, pubescent, forming an angle with the second; second long, sub-clavate; third conical, shorter than the second; fourth very short; fifth and sixth each on one side. Thorax short and thick, rather stout, tibias very slightly curved, compressed and dilated at the tights, in some cases with a transverse suture; tarsi rather broad; ungues and onychia distinct.

Male.—A peculiar form in a projecting conical process on the fourth segment beneath. These flies frequent flowers; their larvae are parasitic on those of the humble-bee. There are twenty species of this insect in the collection at the British Museum, of these not more than three or four are found in England; the others having been caught in the south of France, North America, and Australia.

A single specimen of C. strigata was found near Killarney, in Ireland, in the summer of 1856. (Walker, 'Insecta Britannicae.')

CONSTANTINA. [Constanitsa.]

CONYBEARE, VERY REV. WILLIAM DANIEL, Dean of Llandaff, was born at his father's rectory, St. Botolph's, Bishopsgate, London, June 7, 1757. He entered Christchurch College, Oxford, in January 1779, and took his degrees B.A. in 1808, and M.A. in 1811. Mr. Conybeare was one of the earliest promoters of the Geological Society, and the important services he rendered to geological science may be seen in his numerous papers printed in the Society's Transactions. He is an acute observer of the objects of the physical geography of important districts, and establishing the relations of some of the most remarkable British rocks, and their order of superposition, have furnished data for practical purposes, and show how the absurd misinterpretations of the speculations of the early writers are to be accounted for. His works and articles are little seen from the subjoined titles, his researches were extended to various branches of inquiry. His first paper presented to the Geological Society was 'On the Origin of a remarkable mass of Organised Impressions occurring in Nodules of Flint,' vol. ii., 1814; 'Descriptive Notes referring to the Outline of Sections presented by a Part of the Coasts of Antrim and Derry,' vol. iii., 1816, made a tour conjointly with the Rev. Dr. Buckland, Dean of Westminster; ' Notice of the Discovery of a New Fossil Animal, forming a link between the Ichthyosaurus and Crocodile,' &c., vol. v., 1821. In vol. i., new series, 1854, further notices are given, and ' On the Discovery of an almost perfect Skeleton of the Plesiosaurus; and the same volume contains Observations on the South-Western Coal Districts.' He was a member of the jury of the Royal Society, and of the Royal Society of Antiquaries; 'Extraordinary Landlap and great Convulsion of the Coast near Aixmouth,' Jameson's 'Edin. Journal,' 1840; ' On the Phenomena of Geology which seem to bear most directly on the Laws of the Primordial Mag.' vol. viii., and ix., second series; 'On the Structure and extent of the South-Welsh Coal Basin,' 8th vol. xi.; 'Outlines of the Geology of England and Wales,' with an introductory Compendium of the General Principles of that Science,' &c., 8vo, London, 1829 (conjointly with W. Phillips). He also drew up the 'Report on the Progress, Actual State, and Ulterior Prospects of Geological Science,' published in the first volume of the 'Reports of the British Association.' Mr. Conybeare was elected a fellow of the Royal Society in 1818. He became a Fellow of the Geographical Society, and a corresponding member of the Institute of France. He became Dean of Llandaff in 1845, having previously been public preacher in his own university, and Bampton lecturer in 1830. He died after three hours' illness, on August 13th, 1877, at Ilchen Stoke vicarage, while staying with his third son.

COOKIA, a genus of plants belonging to the natural order Astareaeae. The species are small trees with imparipinnate leaves; leaflets alternate, unequal at the base, or oblique. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base. C. Cookii has a stem as high as 30 feet, with lanceolate leaves, acuminate, hardly unequal at the base.

COOKINON, a medium-sized tree bearing edible fruit about the size of a pigeon's egg, yellow on the outside, the pulp white, rather dense, somewhat flinty, and the fruit is esteemed popular articles of diet in China and the Indian Archipelago, and is known by the name of Wampee. There are two or three other species, natives of the East, all known as Wampee Trees.

COOKSTOWN. [Tyrone.]

COOPER, JAMES FENNIMORE, was born at Burlington,
New Jersey, United States, on the 16th of September, 1789. His father was a Buckinghamshire family, which emigrated to America at the age of nineteen years for the purpose of becoming future novelists. 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 county court. He also wrote on the same subject in the rudimentary branches of learning, he transferred him to the care of the Rev. J. Ellison, an Episcopal clergyman at Albany, by whom he was prepared for college. He remained at this place until 1803, when, having taken his degree, he entered the navy as a midshipman. 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 sea and the phenomena of nautical life, that 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 neighboring village of Cooperstown.

His next few years were spent in private life. It was not until 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, liking the venture, undertook another public notice 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 pictures of the characters and scenery of the frontier, its 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 Prairie," and in 1826 "The Tam-o'-Shanter." 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 red men; the English settlement, and the English and black 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 full; and he published novel after novel with a rapidity rivalling that of the author of "Waverley." For a time his imagination and stores of knowledge appeared to sustain without diminution the heavy drain. He was never hindered by the multiplicity of characters which the reader along with more rapidity and interest, than in the "Prairie" and the "Last of the Mohicans," which appeared after "Lionel Lincon" and one or two others, in 1830; in the "Red Rover" and the "Waver Witch, and the "West of the Wish-Ton-Wish," which followed in succeeding years. But in these and a few others he exhausted his genius, and novels like "Ned Myers," "The Sea Lions," "Mercedes of Castille," and "The Headman of Berne," served only to call into clearer notice the weak points of his author; yet the "Deerlayer" and one or two of his later stories had so much of beauty and strength, that had there 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 Heart's Desire," "The Bravo," "Heidrun," and "Mercedes," none of which were very successful; "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, altogether happy in the literary world, and his machinations in America, although in several of them he recurred 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 the hustings; and his very iniquity for reasoning rendered him the more dogmatic in maintaining his own views and inexcusable under contradiction or dissent.

Some of his home critics he prosecuted for libel; his foreign opponents he denounced with unbounded wrath. However, in 1831, he returned to America, 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. He was one of the most esteemed 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," "The Spy and the Shepherd," "The Virginian," "The Autobiography of a Pocket Handkerchief," "Satanas, the Chainbearer," "The Crater," "Oak Openings," "Jack Yer," "The Sea Lions," and we believe one or two others. He also wrote a History of the United States Navy, which does not give an adequate idea of his abilities. He had also written for the American Naval Officers, "Gleanings in Europe," "Sketches of Switzerland," "Notions of the Americans by a Travelling Bachelor," and "The Way of the West." Most European languages have translations of some of Cooper's novels, and it is stated that one or two of the 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 Delacroix of "The Spy" and of another in 6 vols. by Messrs. Laroche and de Montémond.

Coot hill, county of Cavan, Ireland, a post-town and the seat of a Poor-Law Union, in the parish of Drumreagh, and in the barony of Ignatia, county of Monaghan, 54° 57' N. lat. 7° 2' W. long. 73 miles N.N.W. from Dublin. The population in 1851 was 3105, besides 1101 in the Union workhouse and other public institutions. Coothill Poor-Law Union has 19 electoral divisions, with an area of 106,648 acres, and a population in 1851 of 44,333.

Coothill 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 Catholics and Church of Ireland. There is here a bank of agriculture.

There is here a brick trade in linens, 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 neighbourhood is well cultivated, and returned with numerous demesnes and mansions. Quarter sessions for the county are held at Coothill. There are here a bridge, a dispensary, and a station of the constabulary force. A fair is held on the 1st of July in each year.

Copleston, Rev. Edward, D.D., was born Febry 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 young men. In 1791 Edward Copleston was elected to a scholarship at Corpus Christi, Oxford; and in 1793 he obtained the Chancellor's prize for a Latin poem; and in 1796 he was elected a Fellow of Oriel College, and obtained the Chancellor's "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 1802 he was elected Professor of Poetry to the university, in which office he succeeded Dr. Harris. He published in 1812 the substance of the lectures which he had delivered, under the title of "Prelections Academicae," 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 1810 'A Reply to the Calumnies of the Edinburgh Review against Oxford,' which was followed by another "Reply." This was in the same year, and by a third in 1811. These replies were greatly esteemed, and were generally regarded as a triumphant defence. In 1814 Copleston was elected Provost of Oriel College, and soon afterwards the degree of D.D. was conferred upon him by the diploma, the instrument setting forth that this distinction resulted from the "gratia nobis," which he had 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. John's church, Oxford, An Enquiry into the Condition of Absentees, with Notes and an Appendix on the 17th Article of the Church of England;
of London, 1821. Between the years 1811 and 1818 he contributed many articles to the Quarterly Review.

In 1819 Dr. Copleston was appointed to the deanery of Chester, and in 1827 he succeeded Dr. Summer in the bishopric of Landaff and deanery of St. Paul's, London. He also held the honorary appointment of professor of ancient history to the Royal Academy of Arts, and was an influential member 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 they were delivered. He resided in a spacious mansion in the vicinity of his life at Hardwick House, near Chesham, where he died October 14, 1849. (Memoirs of E. Copleston, Bishop of Landaff, with Selections from his Diary and Correspondence, &c., by William James). Copleston.

COPROLITES (odorif., and solid), the fossilised excrements of reptiles, fish, and other animals, found in various strata of the earth. Dr. Buckland in his Bridgewater Treatises first drew attention to the probable nature of these objects, some of which had been formerly only known under the name of Benzo 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 land and sea reptiles. The excrement contains scales of fish, 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 through its stomach in the form of a spirally twisted form, which is a characteristic of the excrement of the larger forms of recent fish, and has been accepted by comparative anatomists as indications of the nature of the intestinal tube in the extinct forms of reptiles.

Professor Liefig 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 for a distance of two miles. The animal which excreted the coprolite was identified by me as a species of the genus Cricetus 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 abundant in the Lias of Batheston, and Broadway Hill, near Evesham. Dr. Buckland mentions the bone of the testa of Brachyurus, and a fragment of the outer coat of Ginkgo, which are preserved in various strata of the earth. The latter is a bed of Coprolite afforded deposits of phosphatic lime which have received the name of Coprolite, 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 phosphatic lime there found in the form of dark-brown or blackish smooth nodules, can be appropriately called Coprolites. These nodules occur in beds or seams running through the Red Crag of Suffolk, where, in the neighbourhood of Ipswich and Woodbridge, and on the sea-coast of Felixstow and Bawsey, it is worked to a considerable extent. In England, as in France, the bones of various forms of Cricetus, all of which contain large quantities of phosphatic 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. The surface of the earth is lined with numerous nodules of lime are derived from the destruction of organized beings, but it is very evident that phosphatic lime must have existed in some form or another before the creation of either vegetable or animal life. The supposed phosphatic lime is composed of individuals of species of plants and animals demand 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 improbability of calling all deposits of phosphatic lime Coprolites. A better general name and which is not exposed to the objection of a false theory would be Phosphatite."

COPYHOLD. The statute 4 & 5 Vict. c. 35, has been amended by the 6 & 7 Vict. c. 23; 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, after the term expires, to enrich the copyhold at the first surrender and admittance that 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 recognize British copyrights, powers have been conferred on the Sovereign, by the stat. 7 & 8 Vict. c. 19, to grant, by Order in Council, privileges of copyright in this country to the authors of books or compositions, which shall be published outside the country. The exclusive right of representation may in like manner be granted to the authors of dramatic or musical compositions. Such Order in Council cannot, however, be made until due protection for British copyrights has been secured by the government of the country in the subjects of which the privilege 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, 1842 and 1846; Canada, 1846; Russia, 1848; Greece, 1849; France, 1850; the Netherlands, 1851; Belgium, 1853; Germany, 1855; Sweden, 1856; Switzerland, 1857; and Denmark, 1857. I. As to the ratifications have been made by the United States, 1846 and 1849, and by the United States, 1846 and 1849. 16 & 16 Vict. c. 19. Authorised translations of foreign books and dramatic pieces are by this statute protected for a term not exceeding five years from publication.

The Design Act, 1840, enables designs 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 works of art, as well as books, are protected by the statute 16 & 16 Vict. c. 19, to prints taken by lithography, or other process of indefinite multiplication. ("Blackstone's Commentaries," Mr. Kerry's ed., vol. ii. pp. 416-417).

4. Hidrulbrandeisii. - The feld cartilagineo-membranaceous (not stony), crustaceous, suborbicular, adhering by its lower surface; composed of very slender closely-packed web-like filaments imbedded in the feld, orbicular, depressed, pierced by a hole, and containing tetraspores 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, moist, infectious film on the surface of a smooth stone covered with water. When the water in the V-shaped troughs is filled with diatoms, it is attached to a chal-acteristic body by which it may be attached. Viewed under the microscope, a small portion shows minute cells lying in a close-packed mass, which is covered with diatoms, the scale-like depressions, 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. (I) Loliaceae. Loliaceae. - Plant calcareous, consisting of a single plane of cells, which are disposed in radiating dichotomous series, forming an uppressed flabelliform frond. Named from a stone in the bladder, because the cells have stony costs.

5. A. Allmannii is parasitical on Chrysogena clavalessii from an oyster-bed at Malahide, Dublin, by Professor Allmann. It forms minute dot-like patches of a whitish colour on the surface of the shell. It grows in chains of two or three, or several fan-shaped fronds composed of quadrate cells disposed in dichotomous series. The plant is brittle, colourless, and effuse in acid water.

(Harvey, Britton Myce.)

C. deinaperta (Buchneri.-L.)

C. CORBULA, a genus of Marine Mollusca, belonging to the Littoriliombranata. The shell is suborbicular or oval, tumid or depressed, very inequivalve, slightly inequilateral, rounded anteriorly, more or less truncated posteriorly; the prominent surface of the valves more or less furrowed or transversely striated, covered with an epidermis. Hinge composed of a recurved primary tooth in one or both valves, with corresponding socket and ligamental pit beside it. Ligament small, calcareous, tubular impressions slightly marked, united by a pulvinate one with a very slight sinus. The animal is short, with very short united siphonal tubes. Unicissum frambes. Mouth closed, except in front, where there is an opening for a bayon narrow thick foot 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 are now existing. 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 attains half an inch in length and about one-fourth less in breadth.

This genus belongs to De Blainville's family Fyllidae, which embraces Solen, Panopone, Mya, and other allied species. [Pyelospira.]

CORBY. [Lincolnshire.]

CORCHORUS, a genus of Plants belonging to the natural order Tiliaeae. The leaves of C. olitorius are used in Egypt as a pot herb. Fishing-lines and nets, rice bags, and a coarse kind of linen called tat, are made in India of the fibres of C. espurrius.

CORDIA, a genus of Plants belonging to the natural order Cordisaeae. It has a tubular calyx, 4-5 toothed. Corolla funnel-shaped or campanulate, with a flat-6-cleft limb, and a hairy or naked throat. Stamens 5 short, inserted in the throat of the corolla. Style protuding, bifid, with 4 stigmas. Ovary 3-4 celled. Drupe containing 1 stone with 1 or 3 cells, two of which are usually abortive.

C. citrifolia is a native of Hindustan. It has numerous spreading and drooping branches; the young shoots angular and smooth. The general height of trees ten or twelve years old about 20 feet. Leaves alternate, petiolate, round, cordate, and oval, often slightly repand; surface is hispid, dark, tawny and pale underneath; from 3 to 7 or even 8 inches long, and rather less in breadth. Petioles nearly rounded 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, campylate. Segments 5, linear oblong; filaments as long as the segments of the corolla, and inserted immediately under their bases. Style short. Stigma 4-cleft; segments long, rugose, and recurved. Drupe oblate-spheroidal, about an inch in diameter and a quarter in diameter; smooth when ripe, straw-coloured, and rather thick; the edible part is the entire fruit. The native species are: C. Plums, Sebastans, or Sepistans, two sorts of Indian fruit, have been employed as pectoral medicines, for which their mucilaginous qualities, combined with some astrigency, have recommended them. The fruit are said to be good for the "Pensa" of Dioscorides. Linnaeus has erroneously applied the name of Sebasten to an American species of this genus which is not known in medicine.

C. hystrix is a native of many parts of India, Persia, Arabia, and Egypt. The fruit is generally crooked, from 8 to 18 feet high, and as thick or thicker than a man's body. The dark gray, cracked in various directions. Branches numerous, spreading, and bent in every possible direction, forming a dense shaggy head. The flowers are numerous, white, small; from very large proportion of them are sterile, and they always want the style. The drupe is globular, 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 used as a condiment, and in the tinctures of the taste of the kernels like that of filberts. It is the true Sebasten of the European Materia Medica. The fruits, according to Roxburgh, are not used in the Circassian medicinally, but when ripe are eaten by the natives, and also most greedily by the grazing 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 mummy cases. The wood is said by Dr. Boyle to be accounted a mild poison.

C. erumcrocarcinus is a native of the West Indies in woods, and of Mexico, near Acapulco. It has ovoite oblong leaves, acute, quite entire, glabrous; racemose terminal, aggregate; calyx sepals very large; calyx 10-cleft; corolla 5-cleft; stamens 10; ovary downy; limb of corolla 5-cleft; staminate; stamens 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 easily worked. It is called Spanish Elm or Prince Wood by the English, and Bois de Chypré by the French.

C. rumphii has brown wood beautifully veined with black, andsmall black dots.

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 hills, and is divided on the N.E., N., and N.W. by the Grand Salinas from Santiago, Catamarca, and Rioja, and on the W. by a travesia, or desert country overgrown with stunted prickly trees from San Juan. A sterile and thinly inhabited country lies on the south-east between it 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 Laguna Salado de los Porongos is situated, separates it on the east from Santa Fe. It 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 Caracara, which falls into the Paraná near Santo Espirito below Santa Fé. This river would be navigable for six or eight months in the year, but for its small rapids, which however might be easily be bridged. The valleys in the Cordova contain, 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, and spreading the principal wealth of the republic. Hides in large numbers and wool are exported to Buenos Ayres. At present the produce of this province is all sent to Buenos Ayres, but when steam navigation is opened on the Parana, or on the Paraguay, it will probably be largely carried on through Santa Fé. The province is ruled by a governor, assisted by a junta
Coronado, the capital, is situated in 31° 26' 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 much respected by the climate, and is benefited by the constant movement of cold south winds, which blowing alternately on the higher grounds produce sudden changes in the atmosphere which are injurious to health. The town contains about 15,000 inhabitants. The streets are regularly laid out, 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 in the town, and, like the rest of the province, Cordova is 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 province of Cordova is divided into three dioceses: the Dominicans 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 magnificent fountain, The Segura. This stream, which 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 of Cordova. Religious toleration is unknown to the Catholic and Franciscans and Dominicans. A neck town near the base of the Sierra de Cordova, contains nearly 3000 inhabitants.

Corncake (Oenograsteis). [Rallid.] Cret. Crossbi. [Corac.] Corn. [Cura.].

CORNALL (S. 3?)

Corphonium, a genus of Animals belonging to the class Crustacea and the family Gammarid. With the whole of the family it is remarkable for the length of its antennae. It has no claws. One of the species, Cancer gravipes of Linneus, Gammarus longicornis of Fabricius, Oenica volutator of Pallis, is well known on the coast of Le Rochelle for its habit of burrowing in the sand. They live principally upon the anemones which inhabit the sand, and are remarkable for their power of burrowing in great depth, and destroying it although it may be twenty times as large as themselves. They also attack fishes, molluscs, and the dead bodies of other animals.

Crawley 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 Cyclopedia, 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.


3. Trading Corporations.

Under the first head may however be classed those Municipal Corporations, to 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 or Bye-Laws, adherences thereto being enforced when necessary by the Queen's Bench or in Chancery.

The second class of the Municipal Corporations have been treated of under the heading of Corporations by Act of Parliament, having commercial profit for their object. The third class of Corporations is for the purpose of banking or insurance are each regulated by the Act of Parliament, and must each be constituted according to the provisions of these Acts. Other trading companies may constitute themselves into Corporations by registration in a prescribed form, and on complying with certain requisites.

The distinctive ranks of these different kinds of Corporations are noted under the appropriate heads. [Joint-Stock Companies, 2.]

Coriaceous, a genus of Plants belonging to the natural order Rosidceae, of which one of the species, C. alba, is used by the settlers in Australia as a substitute for tea.

Corrientes, one of the Riverine provinces of the Argentine Confederation, South America, comprehends the greater portion of the territory of the present provinces of Paraná and Uruguay; the southern portion of the peninsula being occupied by the province of Entre Rios. The population is about 36,000. The southern and eastern parts of the province are somewhat hilly, and their climate, though in style, and 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, which is the Laguna Yera, which is in part vast marsh overflowed during the periodical rises of the Parana. It feeds all or nearly all the rivers which rise in the interior of the province and fall into the Parana in the province of Corrientes. Corrientes is generally sandy, but produces excellent crops. Cotton, tobacco, rice, sugar, indigo, and other tropical products flourish, yet little attention is given to them, partly owing to the scantiness of the population and partly to the want of good ports. The principal trade is with Buenos Ayres. 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; sugar coal and hides are also large imports from Buenos Ayres. All kinds of crops suffer at times from visitations of enormous swarms of ants and locusts, which entirely devastate the districts in which they appear. The chief employments of the inhabitants are in the growing of corn, and in an extensive and considerate extent of good pasturage 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 places which serve as good ports, and three on 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. The climate has, according to Mr. Woodbine Parish, is "more Guarani than Spanish." There are exceedingly few foreigners in either the capital or the country parts of the province. Most of the population consist of people of mixed race, about an equal number of men and women, from 20 to 40 years of age, and of the age of the sheep, from 100 to 200 sheep. The women are of more industrious habits than the men. They do a good deal of the agricultural labour, as ploughing, hoeing and attending to the crops, and reaping; make cheeses for sale as well as home consumption; make bread and butter; and spin and weave hemp and cotton and woollen 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 18 deputies, one from each of the 14 departments, except the half of the capital, 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 2500 men, but of the ages of 14 and 60 are liable to serve. Indeed during the late war with Buenos Ayres a reserve corps was formed of 900 or 1000 women mounted on horseback, who are said to have proved of great service in some engagements with the Spaniards. The combat between the corrientes in the revolt of the other provinces against the supremacy of Buenos Ayres, and entered into the engagements with foreign powers which led to the downfall of Rosas. The main incitements to the rise of the corrientes was the belief of the inhabitants of Rosas in the right of the province of Rosas to the trade and commerce of the Parana and Uruguay against all foreign vessels, and Corrientes made the opening of the navigation of these rivers a leading object in all negotiations. The army of Rosas was defeated in 1825, and the Rosas was defeated by the troops under the command of Corrientes. Rosas himself escaped to Buenos Ayres, and proceeded on board a British steam-vessel to England.
Granada, from which it is divided by a line extending from Point Barúa (about 83°) north by east, to a point a little west of the lagoon of Chiriquí; on the N. it is bounded by the republic of Nicaragua, from which it is divided by the Rio San Juan from its mouth in the Caribbean Sea to the point where it is joined by the others it is joined by the Caribbean Sea, and west of that by the southern extremity of the large island of Cuba. It is bounded on an imaginary line about 11° N. lat., to Salinas Bay on the Pacific Ocean. On the E., Costa Rica is bounded by the Caribbean Sea; on the W., by the Pacific Ocean. Its extreme W. extent is 35 miles, its average breadth about 80 miles. The area is 17,000 miles; the entire population 100,174.

Coast Line, Surface, etc.—Both the eastern and western coasts have a general north-western and south-eastern direction, but the former is more indented, the latter less so. The eastern coast of the Caribbean Sea the coast is bordered by a narrow plain, is little indented by creeks or bays, and affords no large or secure harbour. Ponta Matina (10° 30' N. lat.) at the mouth of the river of the same name, though small and much from safe, is the best harbour on this coast: it serves as the port of Cartago, and is occasionally visited by vessels from the West Indies. The western coast is much more broken. At its southern extremity is the wide open Guilo Dulce, the low shores of which indent the coast so heavily that it is often difficult to determine which falls into it. Further north is Port Manta and, beyond that is the bay formed by the Rio Estrella: neither of these appears to be used by shipping. More important is the Gulf of Nicoya, which is important northward. It has a wide open entrance turned to the south, in which is a narrow narrow inlet. It affords good shelter for shipping, is about 70 miles in length, and contains several islands. Punta de Arenas, on the eastern side of the gulf, is one of the most important harbours of the whole coast, which is more than 10 feet of water. The Punta de Arenas is the port of San José, the present capital of Costa Rica. One other good harbour occurs on this coast, Punta Calabria, which is formed by the rocky headland called Punta Catalina.

The surface of Costa Rica comprises for the most part a table-land with an elevation of upwards of 2000 feet above the level of the sea. From the range of the Caebezas Mountains in the north-eastern part of the Pacific for vessels not drawing more than 10 feet of water. The Volcano of Cartago is said to be 11,480 feet high. Towards the Caribbean Sea the descent is for the most part abrupt, but terminating from 20 to 30 miles from the sea, between which and the bases of the hills is a low, level, and marshy tract, covered with forest and savannah. From the seaside the Pacific the descent is more gradual; while the high land advances much nearer to the sea and descends to it in a series of terraces. A continuous range of volcanic hills extends from the north-western corner of the table-land of Costa Rica to the coastal range of the north-eastern extremity of the country subsides gradually into the plain of Nicaragua.

The only important river of Costa Rica is the San Juan, which is common to it and Nicaragua. It issues from the south-eastern extremity of the Lake of Nicaragua, and from that point to its outlet in the Caribbean Sea forms the boundary between the republics of Costa Rica and Nicaragua. It is a considerable stream and is navigable for some distance, its course is broken by large sand-banks and rapids. From its commencement in Lake Nicaragua to its mouth, the distance, following the windings of the river, is 70 geographical miles. The width varies from 100 to 400 feet. The difference of level between the Lake of Nicaragua and the Caribbean Sea is 121 feet. The commencement of this river and the Lake of Nicaragua, with a canal from the lake to the Pacific Ocean, that it has been proposed to form the Nicaragua line of communication between the seas of the Atlantic and the Pacific. It is said that this line may be met by forming a road about 66 miles long, from San José to the Saragüé, a feeder of the San Juan, and by improving BROC.
the navigation of those rivers, thus enabling the produce of the republic to be shipped at the port of San Juan, and carry its produce to the countries of the Pacific which fall into the Pacific have all a short course. The Andes, the Andes, and the Andes are among the most important. Several small lakes occur on the table-

lance.

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 of the Tropics is hot and wet, but in Costa Rica it is cooler, the air is not so heavy and moist, and the weather is more adjustable to human comfort. The temperature ranges from about 70° to 85° below 65°.

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 one hand, the soil is light, gravelly, and sandy, on the other hand, the soil is heavy, clayey, and calcareous. The lower declivities, and especially along the eastern coast, 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 north-
western 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. Coffee is how-
ever 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 exportation. 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 the port of Guanacaste. Cacao, indigo, &c., are also grown. The coffee is chiefly grown on the lower declivities, except the vine, and cochineal, which are 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. Of vegetables the leguminous kinds, as peas, beans, lentils, &c., are the most common. There are some good pasture lands, and although the Spanish cattle are of inferior breed, there is a good 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-

seashells 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 Aquacata 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 coarser 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 in-
creasing, and consists of coffee, sugar, and some quantities of cotton goods.

The exports are mainly to Europe. The chief exports are coffee, sugar, and some quantities of cotton goods.

The imports into the United States consist of coal, iron, cotton goods, machinery, and some raw materials.

San José, the capital of the republic, population about 16,000, stands on the elevated table-land, 9° 46' N. lat., 84° 8' 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; and though the seat of the government, 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, Punta de Arena, which is a thriving place, being the principal port of Costa Rica.

Cartago stands at the base of the Volcano of Cartago, about 20 miles E. by S. from San José; population about 9000. It was once the capital of Costa Rica, and is still a place of some commercial 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 1000 houses. It has since been rebuilt.

Alajuela, population, including the surrounding district, about 10,000, stands nearly midway between San José and Punta de Arena, and is a place of some trade. A good deal of sugar is raised in the vicinity. Villa Vieja, about 7 miles W. from San José, is likewise a place of some trade. Curridadab, Asisart, Paraiso, Heredia, Barba, and Esparza, are other towns of more or less consequence.

Government, &c.—The government is in the hands of a provisional government, which has a legislative assembly consisting of 12 deputies elected for three years. The revenue, derived principally from a duty on tobacco and spirits, land sales, stamps, &c., amounts to about 130,000 dollars. The state has no debts to discharge or debts to pay, and is in an internal and external peace for several years. The chief court of justice is the Tribunal of San José, which is presided over by seven judges.

The militia consists of 6000 men, of whom 300 are called upon at a time to form the army on duty.

The white inhabitants of the republic are relatively more numerous in Costa Rica, than in the other republics of Central America: the Indian, or mulatto, are also numerous. They are chiefly settled on the west side of the country, and the remaining population is occupied by the Indians, who number about 10,000.

The Roman Catholic is the established religion, but other forms of worship are permitted. The church is presided over by the Bishop of San José.

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 1821, it remained for a short time united to the Mexican kingdom of Turbe; 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, and by the dissolution of this short-lived union, Costa Rica became an independent republic, and has so continued ever since.

COTIANINA. [CHEMISTRY, S. I.]

COTTON, MANUFACTURE OF. London, Liverpool, and Manchester are the great importations of cotton 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 opposi-
tive 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 also contains two millions, and that the Confederation itself has a population of about 300,000, it is apparent that the cotton trade is the chief source of industry in both 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 the end of 1839. We have now no occasion to give the details of our former article, and for the present have occasion to give the details of a large growth of supplies for the year 1840, occasioned by the demand for larger supplies of the raw 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 depend so much on the United States, 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 been urged in Australia, 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 suppressing 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 be too high. It is not the cost of any considerable increase in the quantities we derive from thence; for though there has been a general increase, the supply is very irregular, and it is not large. In the year 1856 the United States supplied 77 per cent., the British possessions 17, Brazil 3, Egypt 2, and other places 6 per cent. of the total quantities imported. A portion, varying from one-sixth to one-sixteenth, 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, Boston, Liverpool, 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, such as East India goods, stockings, fringe, yarns, &c., to the value of about £1,500,000, which has not been included in the following statement of the import of raw material, and the declared value of exports from the year 1836 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 an increase from other foreign possessions; but we have not thought it necessary to repeat it for every year.

### Imports of Cotton

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Exported</th>
<th>Manufactures</th>
<th>Yarn</th>
<th>Other Places</th>
</tr>
</thead>
<tbody>
<tr>
<td>1856</td>
<td>406,969,077</td>
<td>382,511,153</td>
<td>34,147,615</td>
<td>7,302,367</td>
<td></td>
</tr>
<tr>
<td>1857</td>
<td>290,062,718</td>
<td>287,087,254</td>
<td>3,004,281</td>
<td>1,782,297</td>
<td></td>
</tr>
<tr>
<td>1858</td>
<td>431,437,486</td>
<td>407,956,365</td>
<td>23,481,179</td>
<td>7,443,159</td>
<td></td>
</tr>
<tr>
<td>1859</td>
<td>311,525,000</td>
<td>295,573,448</td>
<td>15,951,552</td>
<td>3,000,999</td>
<td></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 contracted staple, but the cotton 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>Other Places</th>
</tr>
</thead>
<tbody>
<tr>
<td>1859</td>
<td>482,272,500</td>
<td>17,237,510</td>
<td>2,135,370</td>
<td>4,523,416</td>
</tr>
<tr>
<td>1860</td>
<td>482,272,500</td>
<td>17,237,510</td>
<td>2,135,370</td>
<td>4,523,416</td>
</tr>
</tbody>
</table>

In this year the importations from Egypt, which had been gradually declining, sank to 857,160 lbs., but rose the next year to 65 million, and in 1845 to 114 million.

In this year 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.

### Manufactures

<table>
<thead>
<tr>
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In this year Egypt sent 44,923,365 lbs., the largest quantity it has ever furnished in one year.

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<td></td>
</tr>
</tbody>
</table>

The prices given 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 Surat cotton is near the bottom of the list; 1848 was a cheap year, while 1850 was a dear year; the lowest Sea Island (in the beginning of Oct. 1850) was quoted at 8d. per lb., while the highest reached 34d., and Surat was 6d. to 7d. As the very dear cottons are sold only in small quantity, the average price for 1850 was probably about 6d. per lb., and for 1850 about 8d. We give the prices varied at periods, ten years apart, with the latest prices of the so-called Orleans for America, and Fernambuco for Brazil:

### Prices of Cotton

<table>
<thead>
<tr>
<th>Year</th>
<th>New Orleans</th>
<th>Brazil</th>
<th>South India</th>
</tr>
</thead>
<tbody>
<tr>
<td>1848</td>
<td>44d. to 46d.</td>
<td>75d.</td>
<td>6d. to 7d.</td>
</tr>
<tr>
<td>1849</td>
<td>4d.</td>
<td>72d. to 74d.</td>
<td>6d.</td>
</tr>
<tr>
<td>1850</td>
<td>6d. to 7d.</td>
<td>6d. to 7d.</td>
<td>9d.</td>
</tr>
</tbody>
</table>

In the year 1856, the quantities exported were 2,038,491,291 yards of cotton cloth of the declared value of 30,237,750; 85,553,665 yards of lace and patent net, value 455,763; 5,449,339 lbs. of thread for sewing, value 866,383; 1,009,519 dozen pairs of stockings, value 309,664; and other descriptions of manufactures to the value of 370,465?, independent of the yarn. The following list gives the products with the places to which they were sent in the first eleven months in 1857 —

### Cottons, Calicoes, Cambrics and Muslins, Pussions and Mixed Stuff.

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<th>Year</th>
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</tr>
</thead>
<tbody>
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<td>1857</td>
<td>45,741,427</td>
<td>29,212,320</td>
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<td>29,212,320</td>
<td>45,741,427</td>
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</tr>
</tbody>
</table>
The total declared values of the cotton exports for the first eleven months of 1857 are as follows:—Cottons, calicoes, &c., £26,876,922. Cotton yarns, including stockings and cotton thread for sewing, 8,165,905.

A more detailed notice of the sources of production is given in the following statement of the amount of cotton in stock at Liverpool on December 31, 1857: the quantity is stated in bales:

<table>
<thead>
<tr>
<th>Country</th>
<th>Bales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Island</td>
<td>1,960</td>
</tr>
<tr>
<td>Stained</td>
<td>630</td>
</tr>
<tr>
<td>Bowal</td>
<td>56,940</td>
</tr>
<tr>
<td>Orleans</td>
<td>120,820</td>
</tr>
<tr>
<td>Alabama and Mobile</td>
<td>105,390</td>
</tr>
<tr>
<td>Persambuco, Asuncion, &amp;c.</td>
<td>15,700</td>
</tr>
<tr>
<td>Baltra and Mascio</td>
<td>7,300</td>
</tr>
<tr>
<td>Maranham</td>
<td>8,920</td>
</tr>
<tr>
<td>Surinam</td>
<td></td>
</tr>
<tr>
<td>Demerara</td>
<td>70</td>
</tr>
<tr>
<td>Lagnaya</td>
<td>110</td>
</tr>
<tr>
<td>Carlagana</td>
<td>5,170</td>
</tr>
<tr>
<td>Puerto</td>
<td>1,070</td>
</tr>
<tr>
<td>Common West Indies, &amp;c.</td>
<td></td>
</tr>
<tr>
<td>Smyrna</td>
<td></td>
</tr>
<tr>
<td>Egypt</td>
<td>15,200</td>
</tr>
<tr>
<td>Beirut</td>
<td>141,030</td>
</tr>
<tr>
<td>Madras</td>
<td>8,860</td>
</tr>
<tr>
<td>Bengal</td>
<td>150</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 422,510 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 1849; but it is to be remembered that the 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 factories the material is worth three-fourths of the whole price in some specimens, and only one-twentieth in others. A given number of spindles, employed in making cotton twist of the thickness called No. 20, would use up 1,340 lbs. of cotton, in the time which would suffice to pro-

<table>
<thead>
<tr>
<th>Country</th>
<th>Bales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>27,961,058</td>
</tr>
<tr>
<td>Gibraltar</td>
<td>18,433,819</td>
</tr>
<tr>
<td>British America</td>
<td>32,988,413</td>
</tr>
<tr>
<td>West Indies</td>
<td>42,480,308</td>
</tr>
<tr>
<td>&quot; East Indies</td>
<td>422,295,029</td>
</tr>
<tr>
<td>Australia</td>
<td>30,029,516</td>
</tr>
<tr>
<td>Other countries</td>
<td>318,948,774</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,849,376,975</td>
</tr>
</tbody>
</table>

The demand for cotton is much more strongly felt in respect to coarse goods and yarns; and in fine; so much so, indeed, that the demand for foreign market cotton ceases if the price fluctuates beyond its usual limits; whereas in light goods, wherein labour forms a large part 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 account hereinafter 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 constantly increasing, while the supply available 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 the increase is not equal in rapidity to the increase of 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 that, 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. Which 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 15th century the West Indies and 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. The question arises, of which of the several countries, or whether all combined, can furnish a supply which will materially less our dependence on the United States? The Mediterranean authorities themselves are at issue on this matter; for while some point to the East Indies as the source of an exhaustless supply; others feel reliance only 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 machinery have greatly facilitated the production in most of the various branches both of weaving and printing.

COTTON COURT. The whole jurisdiction in civil cases of the old solicitors, or County Court ("Penny Cycles", or "Cycles") in England, has been transferred to the County Courts, first established for the recovery of claimants not exceeding £20 in amount, in 1846, but whose jurisdiction has since been considerably extended by 9 & 10 Vict. c. 89; 12 & 13 Vict. c. 101; 13 & 14 Vict. c. 61; 15 & 16 Vict. c. 54; and 19 & 20 Vict. c. 20.

The new County Courts were intended, not only to bring justice to every man's door (like the ancient Saxon tribunals whose place they have taken), but also to supply cheap justice in different localities by as many different Acts of Parliament, obtained for that purpose. These tribunals which were called Courts of Requests, or Courts of Consistence, and were intended solely for the recovery of small debts, were generally consigned to each county or group of counties; 80 counties were established.

The County Court may entertain suits for the recovery of all debts, damages, and demands, legacies, and balances of partnership accounts, where the sum sued for does not exceed £100. If
an abounding debtor, and by statute 17 and 18 Vict. c. 104, a direct writ of gage by collision or otherwise to another vessel to be detained and an absolute misprision for the injury, or security given to abide the event of legal proceedings.

The nature and jurisdiction of the Court have been described thus fully on account of it not being the direct creation 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. 36.)

COURTS. The Courts, anticipated in the article on this subject ("Penny Cyclopædia," v. viii. p. 115), took place in 1846, in the re-organisation of the County Courts, with a simple and inexpensive procedure, and a professional counsel in lieu of the sheriff and assessors of the old assize. (Covyre Court, 2, S. 2.) The Court, however, has not 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 consistory.

Many of the more important borough courts have however obtained a renewed vitality, by having the provisions of the Common Law Procedure Acts of 1863 and 1864 extended to them, by order in Council. This has, of course, produced some anomalies. An example of this is the action of Liverpool, where the Mayor 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 by the justices of Lancashire, and the Mayor of Liverpool, if he fail to appear at the Court of Passport, that town would be, on the 15th of every year, 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 Bankruptcy, 2, S.; Equity, 5, S.; Patent, 2, S.; Divorce, 3, S.

COWPER, EDWARD, was born in 1770. 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 he was a wealthy owner of patents and that Mr. Applegath 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. Applegath in that establishment. They were also connected with machines for grinding corn, and in the construction of new machinery for printing the Times, of which, in conjunction with Mr. Applegath, he published a description. In fact, some of the most important inventions of improvement of machinery are due to him, such especially as the giving a diagonal action to the rollers on the self-acting ink-stands. 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. Although the model was not admitted to 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 defray a substantial part of the expense. He furnished some contributions to the Penny Cyclopædia, one of which was an elaborate article on a 'Button.'

Mr. Cowper, during some of the last 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 process 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 simple and popular, and he had always a full attendance. His knowledge of machinery, of mechanical construction, and the mechanic arts, embraced the most minute as well as the largest objects. He delivered lectures on the mechanical structure of the Crystal Palace in 1851. He was much respected for his industry, and for the amount of knowledge which he had acquired from his large stores of information to the humblest individuals as well as to persons of higher station. He died at his residence, Kensington, London, October 17, 1855.

COWSLI, JOHN, was born in 1721. He was trained for the bar, but determined to become a merchant. In 1751, he entered into a partnership with Mr. Cradock, and opened a manufactory for making nylons, stockings, and silk gauze. He soon disposed of his interest in the business, and removed to London, where he continued as a merchant until 1766, when he retired from business, and settled down as a farmer at Brixworth, Northamptonhire. He died at his residence, Buckland Park, near Northampton, June 12, 1802.

CRAIG, the uppermost of the distinctly Tertiary Strata of England—using this term in a sense which is perhaps gradually passing away, to be replaced by the larger meaning of Caius. The Crag of Norfolk and Suffolks is partly a calcareous sand, rich in shells; and partly a rudely aggregated deposit of
missions which awaited completion, when he was stricken with a disease—tumour on the brain—which rendered him unconscious. He was taken to the Royal Hospital, the College, and Mammaliferous Crag. The position of these beds will be seen from the following table of the classification of the Tertiary Rocks from Professor Ansted's 'Elementary Geology.'

Newer Tertiary, or Pliocene Series :—
1. Mullock Gravel and Sand.
2. Till.
3. Mammaliferous Crag.

Middle Tertiary, or Miocene Series :—
6. Coralline Crag.
8. Coralline Crag.

CRANBROOK. [Kent.]
CRASSULA, a genus of plants, the type of the natural order Crassulaceae. It has a 6-parted calyx, much shorter than the corolla; sepals flattish; the petals 5, stellate, spreading, distinct; the stamens 6, filamentsawl-shaped; 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 mostly entire, or dentate, the flower most white, rarely rose-coloured. Upwards of fifty species have been described; and many of them, on account of their grotesque appearance, are cultivated in our gardens. They are greenhouse plants. One species, C. falcata, is used in the drug lists of Hope and Hobbs 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 in the United States on the 21st 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 Chantrey, his earliest interest was in the study of architecture. 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 Meissonier. Franez 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 admitted to 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 poetic work of his which attracted particular attention, was the statue of Orpheus, deceased, which he had begun to execute unfinished 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 served for it from the Boston Athenaeum. 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 "Heroidas 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 Athenaeum at Boston, America; the equestrian statue of Washington which stands at Richmond, Virginia; and the more ambitious alto-relievo 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 Genius of Mirth at Richmond, Virginia; and "Prayer;" his groups of "Adam and Eve," of heroic size; "A Family suffering under the plague of Fyery Serpents;" "A Mother attempting to save herself and Child from the Devil," and his life busts of Sappho, Vesta, &c. He also made numerous designs for bas-relief 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 some years 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 com-
Croker, Right Honourable John Wilson, was the representative of a branch of an ancient family which was settled for many generations at Linenham, in South Devon. A member of this family emigrated to Ireland about the year 1600, and his sons distinguished themselves at the capes of Ireland. One of these branches received grants of land in the south of Ireland, which they 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 was a considerable portion of the present State. By his marriage 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 probity and an inquisitive disposition, he was entered at Trinity College, Dublin, at the age of sixteen, under the late Dr. Lloyd. He soon began to show extraordinary readiness and ability by the part which he played in the debating society, in which he was much pressed, but which then was in active operation, drawing 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 the college, with whom he spent the greater part of his 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 'Pamphlets on the Present State of the Irish Stage,' which was published in 1803, and was followed in 1805 by his 'Intercepted Letter from China,' both anonymously. 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 Rowley, 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 was returned for the borough, and confirmed in his seat on petition. He had not been long in parliament when an opportunity offered for the display of his oratorical powers. Early in 1809 the Duke of York was brought practically upon his trial, having been committed to the custody of the Herse Guards, and the best and most 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 in the case, 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 session 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 the affairs of that country. With that confidence and ability and discretion, that shortly afterwards Mr. Perceval, 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 that office with zeal and acceptability. He was one of the 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, Yorkshire, in 1829, and in 1832, was one of the subscribers in the subscription of being returned for the University of Dublin, over against the residence 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 at last defeated. He took a very active 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 Athenaeum Club. He was amongst the earliest advocates of a 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 in its last stages, Mr. Croker opposed it at every stage by powerf ul 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 important of his political movements, he never lost his idle employment. His printed speeches and pamphlets on current political questions amount 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. In 1856, under the title of 'Life of Johnson,' in 4 vols., 8vo, published in 1851, which was handled with considerable severity by Mr. Macaulay in the 'Edinburgh Review.' His poems of 'Ulm and Traflagar,' and 'Life of Shadwell,' among the number of his productions in verse. His 'Stories from the History of England' 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 Malagrovetz, on the Military Events of the French Revolution of 1830;' 'Letters on the Naval War with America,' and 'Songs of Traflagar.'

He was also the author of several lyrical poems of merit, including some touching lines on the death of Mr. Canning, one of which has appeared in a later edition of his '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.

Mr. Croker was the only son 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 1818 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 Croker for a collection of the sweetest and most classical fragments of Irish poetry, for several interesting local traditions. Crofton Croker also had considerable skill in making pen-and-ink sketches, and one of them was exhibited at Cork in 1818.

Major Croker died in 1818, and 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 Croker Croker was permitted to enter the navy under a contract with a salary of 2£. 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 his skill had for many years the superintendence of the private lithographic press of the Admiralty. He subsequently became a clerk of the first class, with a salary of 80£.; and he retired in 1850 with a pension of 86£. Mr. Crofton Croker's first literary work was his 'Researches in the South of Ireland,' published in 1894, in 4to, and con-
sitting for the most part of the notes made during his early experiments, 1832, and during a subsequent tour in 1833. His next work was the 'Fairy Legends and Traditions of the South of Ireland,' London, 1836, 3 vols. 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 assistants, 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 'Pen and Pencil' series, which he in 1837 produced a long complimentary letter from Sir Walter Scott; and on the 20th of October 1836, he was introduced to Sir Walter at the residence of Mr. Lockhart in Pall Mall. His name was written down in his visitor's diary. — Little as a dwarf, keen-eyed as a hawk, and of easy-possessing manners, something like Tom Moore.'

In 1839 Mr. Crofon Croker published 'Legends of the Lakes, or Sayings and Doings at Killarney,' collected chiefly from the manuscripts of R. Adolphus Lynch, Esq., H.P. King's German Legion, 'London, 2 vols. 8vo. This work was followed in 1839 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 not so much appreciated, with very copious notes. The Popular Songs of Ireland,' 1840, was a contributor to some of the annuals which were in fashion from 1839-40, especially to 'The Amulet,' and 'Friendship's Gift,' for two years in succession, or at least a year and a half. He wrote many small articles, some for magazines, and some which were printed privately. He was a constant contributor to the early volumes of 'Fraser's Magazine,' frequently to 'The Literary Gazette,' and occasionally to 'The New Monthly Magazine.' He had always a separate table for antiquities, and he was early elected a Fellow of the Society of Antiquaries. He was chosen a member of the Royal Irish Academy in 1847. He took part in the foundation of the Camden Society in 1839, and of the Percy Society two years later, and was one of the joint editors of these societies, and he edited some of the works published by them. When the British Archæological Society was founded in 1843, he became one of the committees. He was also a member of the United Service Institution, of the Irish Archæological Society, of the Numismatic Society, of the Hakluyt Society, and he was perpetual president of the club of antiquarians called the Society of Novicians. He had collected an extremely interesting museum of Irish antiquities, and he was acting director of it. He lived at his residence, Old Brompton, London, August 8, 1864.

CROMFORD. [Derbyshire.]

CROSI. [Mineralogy, No. 1.]

CROSSE, ANDREW, a celebrated lecturer on electricity and chemistry, was born at Farnham, in the parish of Bromfield, on the Quantock 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. Mr. Bayes, at Bristol, where he had for school-fellows W. J. Broderip, the Rev. John Eagles, and other equally celebrated men. In 1809 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 1809, 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 it. He provided himself with electrical apparatus, and pursued his experiments wholly independently of theories, and searching only for facts. In a cavern near his residence, called Holwell cavern, he observed the sides and roof covered with arragonite crystallisations, and his observations led him to account for the illness of most of them, were afterwards the effects, at least to some extent, of electricity. This induced him to make the attempt to form artificial crystals by the same means, which he began in 1807. He took the lead of the crystal from the cave, filled a tumbler, and exposed it to the action of a voltaic pile for about a week, the pile alone, letting the platinum wires of the battery fall upon opposite sides of the tumbler from the opposite poles of the battery. After ten days of constant action he procured crystals of all the same substances by altering the arrangement 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 tops of the trees around his house, to the length of a mile and a 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 to advantage. At a meeting of country gentlemen, he prophesied '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 foresaw the powers of the medium, he did not think it possible to understand his own prophecy, or even made any experiments in that direction; he continued to confine himself to the endeavour to produce crystals of various kinds, in which he eminently succeeded. After selecting carbonic acid, crystals, or minerals uncrystallised,ption in the form in which they are produced by nature, including one, sub-sulphate 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 pronounced 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 onlooker only. He was invited by the president and some of the scientific gentlemen there, he was induced to explain them publicly, and though unprovided with apparatus, they were so struck with the importance of what he, that he was publicly directed to apply to the government for proper means. He applied and by Dr. Buckland, Dr. Dalton, Professor Sedgwick, 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 surprised by the appearance of an object. It was a small, reddish 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 highly caustic carbonate of potash, and afterwards added a few drops of hydrochloric acid was added to supersaturation. After being exposed to voltaic action for twenty-six days a perfect insect of the Acari tribe, made its appearance, and in the course of a few weeks about a hundred more. The experiment was repeated in other chemical fluids with the like results, and Mr. Weeks, of Sandwick, afterwards produced them in ferricyanur of potassium. This discovery occasioned great excitement at the time. The possibility was denied, though Mr. Crosse and others were directed to him in a similar appearance in his own electrical experiments; and he was accused of impertinence, 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 insect was formed from hydrogen, water, but had since abandoned this view; 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, the chief of which was, that he were giving 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 water, 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 possesses a similar property to that of arragonite; 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 destruction of crystals. In these experiments, he made many experiments of the effects of electricity on vegetation. He found 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 was employed for the purpose of drying plants. In this branch of his researches, Mr. Crosse did not confine his labours to scientific matters. Though living chiefly on his estate in the country, he took an earnest part in all local affairs. He was an active magistrate, just, but benevolent; he advocated the instruction of the poor; and gave money on various occasions to the neighbouring institutions; he left a quantity of poetry, com-
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assembled 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, 1850, leaving behind him the character of a pious good man, and an indefatigable searcher for truth.

CROCKETT, WILLIAM, Doctor of Music, was born in 1775, in a city on the borders of the Thames. While yet a child, he exhibited unusual facility of musical reception, and his performances were 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 the year 1776. He composed all his works in his four years of age. Some anecdotes are also extant, written by the Hon. Daines Barrington, who says, "I first heard little Crotch on the 10th of December, 1778, when he was only three years and a half old." The following notices are extant from memoranda which he made on returning home: "Plays 'God save the King' and 'Minuet de la Cour' almost throughout with chords; reaches a sixth with his little finger; cries 'no,' when I purposely introduced a wrong note; delights in chords and running notes for the base; plays for ten minutes extemporary passages, which have a tolerable connection with each other; seldom looks at the harpsichord, and yet generally hits the right intervals, though distant from each other. His father is an ingenious carpenter, and very musical, as is the case with a great deal of our country music, instead of being the work of a hard coach. Many of his passages hazzarded and singular, of which he executed by his knuckles, tumbling his hands over the keys. The accuracy of this child's ear is such that he not only pronounced immediately what he had heard, but also what he saw on the music, and he immediately repeated the whole down the memory."

As Crotch advanced in years he became a profound theorist and a skilful composer. In 1797, at the early age of twenty-two, he was appointed Professor of Music in the University of Oxford, and the university also conferred on him the degree of Doctor of Music. In 1802 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 coronation, when he presided at the organ on the third, the last, and in a large number of pieces for the harpsichord, pianoforte, the organ of 'Palestine,' and some pleasant vocal pieces, among which may be mentioned the fine ode for five voices, 'Mona on Snowdon calls.' He also published 'Elements of Musical Composition and Oratorio, 1812,' and 'Specimens of various Styles of Music of all Ages, 3 vols."

Crockett, during the latter years of his life, resided at Taunton, Somersetshire, with his son, the Rev. W. R. Crotch, master of the free grammar-school. He died December 20, 1847, in his sixty-third year. He was the author of several works on music, and is remembered as one of the most eminent composers of the English school.

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 in 1813 was appointed to the chief command of the 'Erebus.' He was appointed to the command of the 'Erebus' and 'Terror' in 1819, and commanded the expedition to the Arctic regions. In 1823, he was appointed to the command of the 'Erebus' and '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 fiftieth year. He was a fellow of the Royal and Asiatic Societies, and was celebrated as much for his devotion to duty as for his love of science.

CUDEN, 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 a certain principle of independence, which secured his promotion; and he commanded the Terror in the expedition under Sir J. Ross for the exploration of the Arctic 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 fiftieth year. He was a fellow of the Royal and Asiatic Societies, and was celebrated as much for his devotion to duty as for his love of science.

CUDEN, Dr. Moncreif, Matthew Wright, John Oswald, and John Davis, defendants, in the Court of Common Pleas, in Westminster Hall, July 17, 1739, on an action of trespass, assault, and imprisonment . . . with an account of several other Persons, who have been most unjustly confined in Private Madhouses. The whole tending to show the great necessity there is for the Legislature to regulate Private Madhouses in a more effectual manner than at present, st, v, in 1739. Cuden appears to have been treated while in the asylum with great cruelty, not only by the medical man, by the reader of printers' proof-sheets, and in the occasional preparation of indexes. Among others he is said to have compiled the elaborate index to Newton's 'Milton.'

His first novel was 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 false imprisonment, and was succeeded in his case to his own satisfaction as before. On obtaining his liberty he quietly returned to his ordinary occupations. Subsequently he published the second part of his Adventures, in which he gave a vivid and harrowing picture of confinement, or 'Chelsea Campaign,' as he calls it in his title-page; and in this trial, and endeavoured in vain to obtain an audience of the king, in order to present a copy of the two parts. He also, as he says, 'pleaded very hard that the honour of knighthood might be conferred upon his son, with an offer to fulfil the prophecy about being made a member of parliament for the city of London.' He seems to have actually got himself nominated (April 30, 1764) as a candidate for the city; but he acknowledges that few hands were held up by the public. He is the author of 'Cuden's Adventures, in which he relates the ill-success of a motion he made in person for a new trial; of his applications for knighthood, and for admission into the House of Commons; and the curious results of his History of the Love Adventures, with his Letters, &c., sent for his safety by Whitaker, a lady of shining character and of great eminence,' in which he was as unlucky as in other matters. Impressed with a belief that he had a mission to reform the public manners, he went to preach to the prisoners in Newgate, and then made a journey to Oxford in order to preach to the students at the university. Disguised at the reception he met with, he abandoned preaching, but arming himself with a large sponge, he went about the streets removing any writings or sayings which appeared to him to be in favor of the vice and of the frivolous, and when the affair of Wilkes and No. 46 of the 'North Briton' was exciting so much public ire, his loyalty led him to the active use of his sponge in effecting the offensive number. His insanity seems to have expanded itself in this harmless manner. He continued to pursue his ordinary employments, and found time to enlarge and revise his Concordance. He also published 'Alexander the Corrector's Humble Address;' and other pamphlets relating to the communication of the American discoveries, marked by strong indications of insanity. He died at Ipswich in November 1770. Cuden's 'English Concordance' was far more complete and valuable than any preceding one, and it still retains its value. Three editions of it were published during Cuden's lifetime, and it has since gone through innumerable editions of all degrees of correctness: one of the most esteemed is that of 1815.

CUBITT, THOMAS, was born in 1788, and was the son of a labouring man at Buxton, a village in Norfolk. Thrown
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early 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 large fortune by the improvements he effected in the architecture and sanitary arrangement of London. His father died while he was still a youth. The trade to which he was brought up was that of a carpenter. He went to sea for some time, and then went to India in the capacity of ship's carpenter. Having ac-

2. Skiddaw Slate, usually without fossils, but containing Graptolites, occurs in one locality.

3. Coniston Flagstone and Grit. These rocks find their representatives in those called Cambrian slates in North Wales, and Skenfrith rocks in Herefordshire. Sir Roderick Murchison in his 'Sillarian System.' As the nomenclature of these rocks is still a disputed question, we subjoin the account of them published by Mr. Jukes, in his work on 'Physical Geology.'

'Cambrian or Cambrian Rocks.'—The word 'rocks' is used here instead of 'system,' or 'formation,' because we cannot yet precisely tell the value of the Cambrian division. Cambrian means the rocks of Wales; Cambrian those of Cumberland and Westmorland. In Wales those rocks contain species of fossil which are unknown in England, and resembling, with interstratified beds of green and purple slates. It is in the uppermost of the slate beds of this Cambrian group that the great Phrynix and Llanberis slate occur. In England, there are only two beds which occur, one in the 'Corrib,' and another in the 'Llanberis.' Their upper boundary is a purely arbitrary line along the top of a certain set of beds drawn by the officers of the Geological Survey of Great Britain, under the direction of Sir H. De la Beche, C.B., for their reason for drawing it being simply that no fossils have as yet been found below that line, whereas fossils are pretty abundant in many places above it. It must not be forgotten that Professor Sedgwick (of whose peculiar department we are now speaking, he being the one geologist who has single-handed done far the most to unravel the structure of these older rocks) dissent from this placing of the boundary of the Cambrian Rocks; and himself places it much higher, so as to reach the upper horizon. This shall be called the 'Silurian.'

Cuckoo Flower. [Cardamine, N. 1.]

Cullen, Scotland, a royal and parliamentary burgh and seaport in the parish of Cullen, on the northern coast of Banffshire, in 57° 49' N. lat., 2° 50' W. long., about 134 miles north of Edinburgh. The town, or borough as it was called, was a royal burgh in 1581, and had the right of common bailiwick. The town is built on the western acclivity of a hill which slopes to the margin of the sea, and is nearly in the centre of the Bay of Cullen. The burg is garrisoned by 19 council-

CUMBERLAND Limestone, abundant in fossils.

CUMBERLAND Flagstone. These rocks occur in the district of the Cumberland, and are known in the localities of Skiddaw Slate, and Graptolites, occurs in one locality.

CUMBERLAND rocks. The succession of rocks, as pointed out by Professor Sedgwick in the Cumberland hills, is as follows:

1. Skiddaw Slate, usually without fossils, but containing Graptolites occurs in one locality.

2. Coniston Limestone, abundant in fossils.

3. Coniston Flagstone and Grit. These rocks find their representatives in those called Cambrian slates in North Wales, and Skenfrith rocks in Herefordshire. Sir Roderick Murchison in his 'Sillarian System.' As the nomenclature of these rocks is still a disputed question, we subjoin the account of them published by Mr. Jukes, in his work on 'Physical Geology.'

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Cumbrian, Upper (Coniston Flagstone . . . . . 1500

Cumbrian, Upper (Coniston Limestone . . . . . 300

Cumbrian, Upper (Slates and Porphyry . . . . . 10,000

Cumbrian, Lower (Skiddaw Slate . . . . . 4000

He describes these however as all fossiliferous, which, by the rule lately mentioned, would exclude them from being considered as Cambrian at all, more especially as the fossils of the upper beds are such as palaeontologists seem agreed have consider of Silurian age. It is highly probable that the Skiddaw Slates are of the same age as the Barmouth and Harlech Sandstone Group of North Wales, which likewise contains the best roof-slates of that country.
defence, a renegade soldier, a drummed-out dragon; a dull followed, when he declined returning Mr. St. Leger's visit, and the court was not invited. He had been always a warm politician, and in 1785 he returned to the court of Kilbeggan, on the interest of a Mr. Longfellow. As a representative of the state of the Irish parliament, we may mention that soon after entering the House of Commons he found himself on the side of the aristocracy, to which he sat, and he had no way of vacating his seat he coolly offered to buy another seat, to be filled by any one Mr. Longfellow might choose to appoint. That gentleman declined the offer; but in the succeeding parliament Mr. Curran bought a seat for the adult part, generally acting with Mr. Grattan and the few liberal members who then sat there. His speeches were of a very characteristic nature, to those made at the bar, and he was often appointed to make the reply from his readiness to answer a hurry, without the least regard for the opinions of his opponents. He supported the formation of the Irish Volunteers in 1778, and the unconditional appointment of the Prince of Wales to the regency on the occasion of the king's illness in 1789, and his attacks 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 1784 and the few subsequent years that Mr. Curran's greatest reputation as a debater. In 1799 he was impeached for seditious libel issued in the form of an address to the volunteers of Ireland from the society of United Irishmen (not the same as the rebellious societies which afterwards took this name), from which he was exonerated. Mr. Curran was his cousin, and made an eloquent and vigorous speech, but Mr. Rowan was convicted and sentenced to imprisonment; 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, Theobald Wolfe Tone and Thomas Francis McDonnell. He had retired from the Irish House of Commons before the introduction of the measures for the Union, of which he strongly disapproved, and which he ever continued to lament. The dissension of 1803 brought trouble into his family; Robert Emmet, one of its leaders had formed an attachment for Miss Sarah Curran, which was returned; and his correspondence with her, with his visits, sometimes secret, to her father's house, led to a suspicion of Mr. Curran's loyalty, and to the searching of his house. He was charged with treason by Standish O'Grady, and the privy council, by all of whom his perfect want of complicity was instantly admitted. Mr. Emmet had named him one of his counsellors, but he did not appear before Mr. Emmet, who was arrested, on his fate and his love adventures the subject of two of Moore'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 satisfaction; 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 amount of verse of more than ordinary merit, but which bears no comparison with his eloquent speeches.

CURSORIT 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 (Columba diopho). [COLUMBIDE.] CYAMELIDE. [CHEMISTRY. S. 2.] CYANAGROCHE. CHLORIDE OF. [CHEMISTRY, S. 1.] CYANIC ACID. CHLORIC ACID. CYCLADID, a family of fresh-water mollusks, which shells resemble those of *Koilia* or *Astarea*, but whose soft parts present actual structural characters of a genus distinguishing them from the tribes to which either of those genera belongs. The shells are more or less tumid, equilateral or inequilateral, thin, as in our British forms, or thick, as in the foreign *Cyclo;* smooth or concentrically striated and furrowed, and covered with an epidermis. The bivalva 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 longiform foot. They live buried in the mud of slow streams, lakes, ponds, ditches, and springs. Our native species are all evo-

viviparous. They breed readily in confinement, and often exhibit considerable activity, ascending the sides of the vessel in which they are placed. (Forbes.) This family contains two British genera, Cylas and Pinctada. Cylas has the shell equivale, thin, subboricular, more or less inflected, slightly inequilateral, closed, smooth, or concentrically striated; cardinal teeth, one in the right and two in the left valve; lateral teeth developed; ligament external.

C. rivicola has the shell oval, globose, striated; umbones obtuse; dorsal area with a small tubular impression; ligament external.

The ordinary length of the finer specimens is 10½ 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 longiform; the mantle white; the labial palps long, triangular, and strongly striated. It is sluggish in its habits.

Forbes and Hanley give the following localities:—The mussels are common in the river Thames; it is found likewise in the New River (Baily); the Trent (Jenyns); the Lea (6. H.); the canals near Leamington, in Warwickshire (Thompson); streams in Yorkshire (Dean). In a pond at Enville, Stafford-

shire, young specimens (Jeffreys). It has not been taken either in Scotland or Ireland. On the continent it occurs in Germany, France, and Belgium; and as a fossil is found in the Pleistocene Fresh-Water Beds of the south of England.

C. cornes, Linn. Shell subglobular, almost smooth; umbones obtuse; ligament inconspicuous. There is a subglobose variety (apparently the Stigmocila of Mr. Sheppard), which is flattened towards the ventral margin, and has the pellicul 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-conic, 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. (Jenyns.)

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. calcarea has the shell more or less rhombic; 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 Westmoreland for its localities. Montagu met with it in Devonshire and Wiltshire; Mr. Jenyns at Braham Common in Surrey, and more sparingly in Cambridgeshire; and Mr. H. Strickland at Hernsea in Yorkshire. Mr. Jeffreys has taken it in the Clumber Lake, Nottinghamshire, and in the neighbourhood of Bristol. In Ireland it is also rare.

On the Continent it occurs in Sweden, Germany, Belgium, France, and Italy. The C. portumnae of Say, in despite 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.)

Pinctada has the shell equivale, thin, usually tumid, sub-oval, inequilateral, smooth or concentrically striated; hinges 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 Cylas, and not uncommon even in drains through meadows. P. pinnaeformis. Shell rounded, oval, not greatly inequi-

lateral, sometimes irregularly striated; valves not swolled, always a little compressed below; umbones usually broad, but little projecting. This is by far the commonest of the smaller Pinctada in this country. It is found abundantly in ponds and ditches. It inhabits generally northern and central Europe.

P. pulchella. Shell small, striated (not grooved); um-

bones simple and without appendages. There are many varieties of this shell. It has a great tendency to assume a shorter side. The left valve is usually about one-third longer, 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. Henslow-

sianus, P. striatum, P. cinereum and P. obtusata.

C Y R L A C R E. Cylas, a natural order of Exogenous Plants. The order consists of shrubs with evergreen simple leaves without stipules. The flowers usually in racemes. The calyx 4-5-parted. It has 5 distinct petals, with an imbricated stamnation. The ovary is 2-3-4-celled, always bilocular; the number of carpels different from that of the calyx, corolla, and stamens; solitary pendulous ovules, a short style, the stigmas with as many lobes as there are cells of the ovary. The fruit is a succulent capsule or a drupe; the seeds inverted; the embryo in the axis of a very large quantity of albumen, with a very long superior radicle. This order is related to Oloacanthus and Pituophorus. All the species are inhabitants of North America. Nothing has been recorded of any uses to which they are applied.

C Y T H E R E A, a genus of entomostracous crustacea, belong-

ing to the class Podgyadopoda, the order Ostracoda, and the family Ctenodida. The species are found very commonly in Great Britain. (Brachionopoda.) Mr. Rupert Jones, in his ' Monograph of the Entomostraca of the Cretaceous Forma-

tion 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 y t h e r e l l a is a genus separated from the group of species known as Cytreas by Mr. R. 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, beaks wrinkled, ridged, and beset with tubercles, and crenulated or strongly toothed on the margins.

Dr. Baird has described three recent species, whilst nine fossil forms have been described by Mr. Jones from the chalk.

C y t h e r i d a is a group of species formerly referred to Cytreas, and separated by M'Coy. The valves externally are convex and smooth, sometimes finely pitted or spinous, never ribbed or granulated; the hinge is simple.

This genus has no recent species. Six species have been found in the chalk.

C y t h e r o t e r i a, a genus separated by Jones from Cytreas. It embraces species of Cytherina of other authors. The cara-

pace 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.

(Rupert Jones, Monograph of the Entomostraca of the Cretaceous Formations of England; W. King, A Monograph of the Permian Fossils of England, both published by the Palaeontographical Society; Baird, Natural History of the British Entomostraca—Bay Society.)
D

DACRIDIUM, a genus of Gymnospermous Plants belonging to the natural order Fasceae. One of the species, D. farro,
folium, the Kakar Pillar-Tree of New Zealand, acquires a
height of 200 feet. From its branches may be manufactured
a beverage resembling in antiscorbutic qualities the well-
known bek-vine-bark.

DADYR (Cameravy, S. 2.)

DAGUERRE, LOUIS JACQUES MANDE, was born in
1789 at Cormeilles in the department of Seine-et-Oise, France.
At the outset of life he obtained a situation in a government
office, but he early quitted that employment, and became a
peep of M. Dugot, 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 experience he thus acquired
suggested to M. Daguerre the idea of producing a kind of
exhibition, in which the illusion should be more
perfect than in the panoramas, and he invented, in conjunc-
tion with Bousin, a method of so throwing coloured lights
and shadows upon the view, as to produce the appearance of
changing objects, which he called a daguerreotype.
This they termed a Diorama, and when exhibited, July 1839,
in a circular structure erected for the purpose in Paris, the
success was complete. The diorama in fact made what the
Parisiens term a sensation, and no long time elapsed before
Messrs. Bousin and Daguerre had established 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 picture followed picture, each rivalling its predecessor,
but in 1839 a fire destroyed the building, and the view then
enjoyed the property which sells of precious忙着 of changing
colours, when exposed to the action of the light, and this property
had been the subject of many experiments by scientific men.
Sir Humphry Davy, among recent chemists, had sought by
various applications of this property to obtain copies of
translucent objects, but thoug he succeeded in obtaining
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 1839 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
persevered, and at length his zeal and rare ingenuity met
with an ample reward. He discovered in fact a method by
which he was able 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
to reproduce 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
remarkable process of photography, will be found in the article
PHOTOGRAPHY, § 1.] It will be enough to say that with
remarkable patience and ingenuity he surmounted every diffi-
culty, and eventually produced his discovery, as to its prin-
ciples, perfect. Other experimentalists had tried in this ec
sential, and were at work, unknown to Daguerre, at the same
ideas, 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 country-
man, Mr. Talbot; but, as was to be expected, both the pro-
cesses as now practised are very different from what they were
when originally promulgated by their inventors or discoverers.
Great was the excitement among both learned and un-
learned when in January 1839 M. Daguerre presented to the
Académie des Sciences, an account of the new method
by which, as was said, the sun himself became the artist, and
some of the delineations, with all their wonderful delicacy of
detail, were exhibited. At the same time Daguerre made a
public exhibition of numerous pictures produced by what
he termed the Méthode Niepce perfectiënées.' An exami-
nation of the merits of the new method was, at the sug-
gestion of M. Arago, promptly ordered by the French govern-
ment to be made, and in consequence of the favourable nature
of the report, M. Daguerre was in June 1839 nominated an
Officer of the Legion of Honour; and the project of a law
was on the same day presented to the Chamber—by whom
the law was readily adopted—which accorded to M. Daguerre, on
condition of the full publication of his method, an annuity
for life of 6000 francs, and one of 4000 francs to the represen-
tative of M. Niepce. The rapid extension and improve-
ment of the process of Daguerre (or the Daguerreotype, as it
is now called) was greatly augmented by the free use of the
freely made public property, was due perhaps more to others
than to M. Daguerre, who however never ceased to labour at its
improvement during the remainder of his life. He died
July 13, 1851, at Petit-Bribe-sur-Marne, where a handsome
memorial tablet marks the spot where he retraced by subscription to his memory.

M. Daguerre is the author of two short works—Histoire et
Description des Procédés du Daguerreotype, et du Diorama,'
Savoisie, Paris, 1839; and 'Nouveau Mode de préparer la
Couché Sensible des Plaques destinées à recevoir les Images
Photographiques,' 1840.

(Anno, Rapport à l'Académie des Sciences; A. de Laize,
art. Daguerre in Nouv. Bdeg. Gén.)

DALBERGIA, a genus of Plantae belonging to the natural
order Fasceae, named in honour of Nicholae Dalberg, a
Swedish botanist. It has a campanulatae, 5-calci, 5-st.,
5-pelliculatae corolla, the petals of the keel connected to
the apex; 8-10 stamens, sometimes all monadelphous, with the
tube or shaft chief in front, sometimes divided into two
equal opposite bundles. It has a stipitate membranous
compressed legume, which is flat, oblong, and tapers to
both ends. The seeds, which vary from 1 to 3, are
compressed and remote. The species are sometimes trees, but
tallly climbing shrubs, with inapti-plumulate leaves.

D. monasteri, 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.

DALKEITH, 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 railway. The population of the
town was 6086 in 1861. The affairs of the burgh are adminis-
tered by 15 trustees. The town stands on an elevated piece
of ground, between the rivers North Esk and South Esk;
consists of one principal 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
principal market is that of the building of the
Buchanen family. A splendid new church, in the early
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 park is a large lake of Boiling, 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 be-
yond the town, which is situated on an elevated peninsula formed by the two streams. The regality of Dalkeith be-
longed to the Grahams in the reign of David II. It after-
wards passed into the hands of the Earls of Morton, and about two centuries ago was purchased by an ancestor of the present Earl of Rosebery.

Dalkeith after the battle of Preston Pans, and the palace
has been visited by George IV. and Queen Victoria.

DARLIMPLE, JOHN, was born in the year 1804 at
Norwich, where his father was a surgeon in general practice. He graduated in medicine at Edinburgh in 1818, and
in London. He commenced practice as a surgeon in London
in 1827. During the latter part of his career he devoted
himself entirely to ocular 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 1834.
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 im-
portant : 'On the Vascular Arrangement of the Capillary
Vessels of the Allantoid and Villitine Membranes in the Incubated Egg.' (A. R. S. Edin. 1834.) 'On the Family of Clos-
tures' (Annals of Science, vol. v.) In 1849 he read a paper before the Royal Society on a hitherto undiscovered infusory animalcule allied to the genus Nodokrassata of Ehrenberg. This paper was interesting as
confirming the discovery of the sexuality of the rotiferous
animalcules, 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.

DARLING, was one of the surgeons of the Royal
London Ophthalmic Hospital. He was a Fellow of the Roy-
al College of Surgeons of England, and in 1851 was
lected a member of the council of that body.

DAMAGES. The stat. 1 Geo. IV. c. 87, enabling a land-
lord to recover damages in the action of ejectment by which
he recovers possession, although not repeated, is rendered
by provisions to the same effect in the 'Common Law Pro-
cedure Act,' 1852.

DAMAN. [DAMARK.] DANCE, a small natural order of Plants related to the Ferns. They have all the habit of Doraferas Ferns, but their spore-cases are ringless and combined in masses, splitting irregularly by a central cleft. The species are all
found in the following genera:—Korforaria, Anetephoris, Donna, Esophryum, Merytisia, and about fifteen species. Anetephoris erecta is said to be employed in the
Sandwich Islands to perfume cocoa-nut oil. The rhinome of a species of Merytisia is eaten by the Sandwich Islanders.

DANAE. [MINERALOGY, S. 1.] DANUBE. [SARCOUS.] DANEWORTH. [LUTHER.] DAPLEI. [FRENEH.] DAVILLA, a genus of Plants belonging to the natural
order Dilleniaceae. It has 5 very unequal sepals, which
increase after flowering; from 1 to 6 petals, with linear fila-
ments dilated upwards. The single carpel is testaceous, fur-
nished with hairs, and united in the inner concave valvate
sepals. The seeds are solitary, enveloped in an arillus, which
is only open at the apex.

D. elliptica has a shrubby ereth much branched stem, with
hairly branches. The leaves are elliptical, obtuse at each
end, entire, barbicate and leathery, rough and
hairless above, downy and netted beneath; the petiole
vulnus on the under side. The racemes are hairy and bracteolate;

D. ruosa is also a native of the forests of Brazil, and has
a twining stem with hairy twigs. The leaves are oblong,
remotely and obsolete serrate, rough and hairless above, the edges
and principal nerves plicate, and a few petioles to a
very shiny beneath. The peduncles and pedicels hairy, it
has two or three petals. Like the former species it is an
stinging, and is used in South America in swellings of the
legs and different parts of the body.

DE LA BECHE, SIR HENRY THOMAS, an eminest geologist. He was the only son of Colonel Thomas de la
Beche, of Halst Hall, Jamaica, and represented the old family
of De la Beche, who are of ancient origin, and have held
14th centuries. Sir Henry was born near London in 1796.

He went to Jamaica when young, where his father died,
and whilst returning to Europe his mother and her young
son suffered shipwreck. On reaching England they lived a
sufficient time, but Sir Henry, at a very tender age, was
seems to have acquired his first taste for geology. He
was educated at the military school at Great Marlow, which
was afterwards removed to Sandhurst. He entered the army in
1814. In 1817 he became a Fellow of the Geological
Society and in 1821 he was elected a member of the council of
that society, and eventually, in 1847, President.

In 1818 he married. Before this event he had begun to
investigate the geology of Devon, Dorset, and Pembrokshire.
He now travelled on the Continent, and dwelt for some time
in Switzerland. Here in 1820 he produced one of his earliest
scientific papers, 'On the Temperature and Depth of the Laps
of Geneva.' This was first published in the 'Bibliothèque
Universelle,' and afterwards in the 'Edinburgh Philosophical
Magazine.' In 1827 he published a paper on the 'Pleuro-
saurus.' This was done in a paper published in 1823 in the
'Transactions of the Geological Society,' and entitled 'On
the Discovery of a new Fossil Animal, forming a link between
the Ichthyosaurus and Crocodile.'

In 1824 Mr. de la Beche visited his paternal estates in
Jamaica. Here he made himself remarkable for attempting to
introduce ameliorations in the condition of the slave. He
suffered considerably from the Act of Emancipation. Whilst
in Jamaica he was much surprised by the singular information
he received from British amateurs on the subject of science, and a paper published in 1826 in the 'Transactions
of the Geological Society,' on the 'Geology of Jamaica,' was
the result.

Returning to England, his papers on the geology of Dorset,
Devon, and Wales, became very numerous, besides others on the general principles of geological inquiry. Such were his papers on the 'Classification of European Rocks,' 'On the Excavation of Valleys,' 'On the Geographi-
cal Distribution of Organic Remains,' 'On the Formation of
Yew and Gorse, and on the formation of other
others. In 1831 he published his 'Geological Manual,' which
went through several editions, and was translated into French
and German soon after its appearance in England. In this
year he also projected a plan of forming a geological map of
England, and the delineation of the different geological units
should be accurately laid down. He began this gigantic
undertaking on his own responsibility, and commenced a
map of Cornwall. This resulted in the government instituting
the 'Board of Survey and Ordnance.' In 1834 he published
'Researches in Theoretical Geology,' and in 1835, 'How to
Observe: Geology.' In 1845 the Geological Survey and
Museum of Practical Geology were united, and the building
in Jermyn Street, Westminster, erected for the reception of
the rapid increase of the collection of the latter. Sir Henry
succeeded in attracting to this institution a number of ardent
young men of science, amongst whom we may mention the
late Professor E. Forbes, and through their labours this insti-
tution rapidly became one of the most important scientific es-
establishments in the country. In 1851 courses of lectures were
given by the various members of the corps, and under the
name of the Government School of Mines, they are
now on with increasing vigour and usefulness under the presidency of
Sir Frederick Pollock, Sir Roderick Impey Murchison, and Sir Walter
For several years previous to his death, Sir Henry had
suffered from a gradually increasing paralytic disorder, which,
although it prevented him using his limbs, left his fine
intellect almost unimpaired. Day after day it was evident
that his frame became feebler, but his attention to the interests
of the school he had founded did not diminish, and till
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DEBENHAM. [Burlon.]

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 the public mind, and nothing to the courts, of what was so called, from any other action for breach of contract.


DEDINGTON. [Oxfordshire.]

DEEP MOUTH. A term used in the Egyptian and Carian scripts.

DEFAMATION. The jurisdiction of the Ecclesiastical Courts, or, as Blackstone says, of "a petty arrogante in the country" to punish for "railing or contumelious words" in "sacra arma", by means of the "brutum fulmen of ecclesiastical censures," having long been a subject of considerable ridicule, though frequently of grievous oppression to the poor, has at last been abolished by the statute 18 & 19 Vict. c. 41.

DELAROCHE, PAUL, an eminent French painter, was born in Paris in 1797. Early intending to follow art as a profession, he 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 Delarocque entirely emancipated himself from their thraldom. But he did not desert the study of landscape and architecture, to which his mind had been so much attracted. Still adhering 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 the grandeur of style of the ancients and of the Middle Ages. He was, however, with his superiority in his chosen line to be generally recognised, and Delarocque was the acknowledged chief of a school, that school received the name of the "École de Delacroix," in contradistinction to the Romantics of Delaroche and the Classic School of David and his followers.

Paul Delarocque in 1819 and the following years exhibited some paintings of scriptural subjects, but it was not till 1834 that he acknowledged the public. His paintings at that period are noted for the finish of his manner, and the beauty of his composition. His pictures never reach the highest order of art. They are rather melodramatic than epic or tragic. They are suggestive always of a certain kind of stage effect. You see that the painter is aiming at the actor's trick — that he is seeking to make an impression. But allowing for this, it must be granted that M. Delarocque, that estimable countryman of mine, has had undoubted genius, if it was not of the highest order; he was a master of his art; and he was always truthful, conscientious, correct in draughtsmanship, and as a colourist, and tells his story with admirable perspicacity.

M. Delarocque was justly regarded by the French as one of their greatest living painters. His pictures reach the highest order of art. His pictures never reach the highest order of art. They are rather melodramatic than epic or tragic. They are suggestive always of a certain kind of stage effect. You see that the painter is aiming at the actor's trick — that he is seeking to make an impression. But allowing for this, it must be granted that M. Delarocque, that estimable countryman of mine, has had undoubted genius, if it was not of the highest order; he was a master of his art; and he was always truthful, conscientious, correct in draughtsmanship, and as a colourist, and tells his story with admirable perspicacity.

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DENIZEN. Letters of Deniziation are now disused, aliens generally having recourse to the simpler and more advanta-
geous certificate of naturalization granted by the Secretary of State. [Acres, S. 1.]

DEN'TINE. A genus of Fishes belonging to the Family Spardae. 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 inward, forming hooks; teeth on the branchial arches, but none on the vomer or palatine bones; nose and suborbital space without scales; branchiostegous rays 6. There are several species of this genus.

D. vulgaris, the Four-Toothed Sparus, is regarded as a native of the Mediterranean sea, and seen. It is stated to have been taken in this country, and that by Mr. Donovan in 1805 off Hastings. It is a very common fish in the Medi-
iterranean, and is the Dentex of the Romans. It is remark-
able for the great length of the four anterior teeth in each jaw, which are placed in a single row, leaving a large gap. It weighs 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 con-
sider its ferocious inclination and the strength of its formi-
dable canines teeth, we may fairly attribute to 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 swallow them copiously. This species is
little swiftness, as its teeth are so strong and its gills so
abundant and proximate, and soon attains to a considerable size. Willughby 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 Sparus are carried on under an extensive charter granted by the Emperor. In the
regions of Dalmatia and the Levant, the capture of this fish is an object of material consideration, both to the inhab-
itants generally as a wholesome and palatable food when fresh, and to the mercantile interests of those countries as an article of export. They prepare it with considerable	
ancient custom, by cutting it in pieces and packing it in bar-
rels with vinegar and spices, in which state it will keep perfectly well for twelve months."

DENTINE. [Tissue, Organic, S. 1.]

DEONARD. Judges and juries having (as stated in the Penny Cyclopaedia, vol. viii. p. 411) alike condemned this species of forficule, the law has been altered by the statute 9 & 10 Vict. c.62, and deodands are now entirely abolished. [Criminal Cases]. The statute 11 & 19 Vict. c. 42, has prescribed with great care and exactitude the 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 presence of the accuser, 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 by an Examinor, and 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 put in practice in American courts of common law, which is justly considered a great improvement in fact, was introduced as part of the practice of the Court of Chancery by the statute 15 & 16 Vict. c. 86. (Blackstone's 'Commentaries,' Mr. King's ed., vol. iii. p. 503.)

DEPPING, GEORGE BERNARD, was born at Münster, May 11, 1784. Having completed his educational course, he visited in Paris in 1808, when, forming acquaintance there, and observing the facilities which the city afforded for the pro-
secution 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 promoting juvenile and other works chiefly of a geographical subjects, in translating, and in writing for magazines and encyclopedias. His first important original work was one written for a prize offered by the Institute on the 'Expédi-
tion Maritime des Normands en France au Dixième Siècle.' This is a History and Geography of Normandy, written in French, and published in 2 vols. 8vo, Paris, 1830; 'Histoire du Moyen Age, Essai Historique sur leur État Civil, Commercial, et Littéraire,' 8vo, 1840; 'Règlements sur les Arts et Métiers, rédigés au Tréntième Siècle,' and connus sous le nom de Livre des Métiers d'Étienne Boileau,' &c., 4to, 1837; 'Geschichte der deutschen Schifffahrt im Mittelalter,' 4to, 1840; 'La Rénaissance maritime des Normands,' 2 vols. 8vo, Münster, 1840; 'Correspondance Administrative sous le Règne de Louis XIV.' (forming vols. i. to iii. of the 'Collection
Documents Inédits de l'Histoire de France'), 4to, 1850-53; 'Romansco Castellano,' 1 vol. 12mo, Paris, 1817, and several others. M. Deppingle has written also the biographies of various maritime and literary personages, and in some works have been translated into German and Dutch, while seve-
rals of his juvenile works have been translated into most of the European languages. M. Deppping wrote many of the more im-
mportant works of the 'Journal des Sciences,' 'L'Art de diri-
ger les Délices,' &c. He died in Paris September 6, 1853.

DERMATINE. [Mineralogy, S. 1.]

DESIGN, SCHOOLS OF. [Science and Art, Depart-
ment of, S. 2.]

DESMENTIA, a group of organised beings regarded by
some naturalists as Animals and by others as Plants. The
terminology who have adopted them into the vegetable kingdom have regarded them as Algae, and allied to the Dicotyledoneae. Some who admit the vegetable characters of Des-
mentia, regard them as classed under the Genus Rhodochry-
seus, and others as under Desmochyseus as a sub-order of the Dicotyledoneae, which he characterises as crystalline branchial fragmentary bodies, brittle, and multiplying by spontaneous separation. Amongst this group of Desmochryseus are classed as being especially peculiar. The following is a list given by Mr. Raffles in his 'British Desmochryseus,' a work which has greatly increased our knowledge of those obscure beings: 'Fresh water figured, mucous, and microscopic Algae, Desmochryseus, Desmentia, and Rhodochryseus, consisting in some genera incompletes. Cells or joints of two sym-
metrical valves, the junction always marked by the division of the endochrome, often also by a constriction. Sporangia formed by the coupling of the cells and union of their con-
tents. It will be seen from this definition that Mr. Raffles regards these beings as plants. The principal points on
which he relies for establishing this position are the occur-
cence of conjugation and swarmmg, and the presence of starch amongst the Desmochryseus."

The union or conjugation of the two filaments for the production of spores, has long been known amongst certain forms of Converre. This has been seen by many observers to occur amongst the Desmochyseus. In the
Eucratium rumputre, p. 3 represents the genera) Nageot describes this process. Two individuals are placed close together, and push out short processes, which meet, and by the absorption of the wall constitute a canal, into which the entire contents of the two cells thus connected enter, and imbibe, so that one becomes a single cell. This process is not always identical in different species. In Closoterium (fig. 6) the middle of the cell-membrane dehiscens with a transverse fissure, and the entire contents from two contiguous opened cells coalesce into a single round or angular mass, and pass into the spore containing green bodies which result from the union of the cells, that they are not in all cases developed into a single Closoterium like spores; but that, as in the case of other Algae, such as
Voschera and Gelodoreum, there are two sorts of spore-
formations, and that under certain circumstances these green bodies represent a germ, capsule, or sporangium, in which, by a process of division, several young Cladostersia come to be produced. The union of the cells of Didemnum Borberi 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 in unicellular organisms, which are regarded as decidedly animal.

The process of swarming is one which, although a few years ago its distinguishing feature would have been regarded as entailing the organism exhibiting it to a place in the animal kingdom, is now by English naturalists, and is regarded as purely vegetable. It has been observed in many species of Conchocelis, more especially in Cladosteresia and Conchocelis arenosa. The following is M. Agardh's account of this curious phenomenon in the latter plant. After describing the interior 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 mamilla, which is to become the point from which the moving granules finally issue. By the extension of the membrane for the formation of the mamilla, the tender threads of the plant burst between them, making the mamilla at the end of the mamilla, and it is by this passage that the granules escape. At first they issue in a body, but soon those which remain, swimming in a much larger space, have much more difficulty in escaping; and it is only after innumerable knockings (turbations) 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 spores are furnished with a little beak, a kind of anterior process always distinguishable from the body of the spore by its paler color. It is on the vibrations of this beak 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 by a hyaline border, as we find among the ciliated Infusoria on applying a glass of insufficient power. The spores during their motion always present this beak 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 beak. The motion of the spores before their exit from this point consists principally in quick dartings along the walls of the articular spaces, which themselves are caused by innumerable shocks; and in some cases we are almost forced to believe that it is by this motion of the spores that the mamilla is formed. Escaped from their prison, they continue their course for one or two hours, some hours longer; and retiring gradually towards the darker edge of the vessel, sometimes they prolong their wandering courses, sometimes they remain in the same place, causing their beak 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. Ralfs, Dr. Halle, and others in various species of Didemum, more especially in Syntrophes crispus and Dragmellum tenuis. No similar movements to these have been anywhere observed among the ova of the animal kingdom.

The presence of starch in the Democclus is a third point relied on by Mr. Ralfs 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 Algæ, and Mr. Ralfs and others have since corrected the observation. 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. Busk ('Microscopical Journal,' vol. ii. p. 106). This may lead to the conclusion that the starch is more commonly met with 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 Cladostersia, for placing the species of this genus amongst animals—

1st. That while Cladostersia 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 parietes of which appear capable of contracting upon its contents.

2nd. That the green gelatious body is contained in a membranous 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 cytoplasm and cells of plants precludes the possibility of our considering them as the latter, while the appearance of a vitelline nucleus, transparent but 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 Entozoon.

4th. That while it was impossible to determine whether the vague motions of Cladostersia were voluntary or not, yet the idea the author had formed of a suckorial apparatus forbade his classing them with plants.

On these reasons, Mr. Ralfs remarks, that the peculiar organ—the terminal globules—of the Cladostersia are as much vegetable as animal. That the throwing off the contents of the cell through chemical reagents, is as much vegetable as animal. "If fresh water touches Grifithsea oocysts, the joints burst and escape into the current." That the supposed ova contain starch, and are therefore vegetable. That he cannot discover that the orifices at the extremities of some of the Democclus are tubes, or that they possess a suckorial power.

1. Didemnum Borberi, with the cells uniting to form the green matter.

The Democclus are all of an herbaceous green colour, and from this circumstance are easily discovered amongst the other microscopic beings with which they occur. They are mostly inhabitants of fresh water. Mr. Tawte records two or three species from brackish water. They are remarkable for the very definite outline which their forms assume, especially in the genera Microstalasia ('fig. 2'), Enterium ('fig. 8'), Xanthodinum ('fig. 4'), and Pedilastum ('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 Pedilastum and Smedemus it is less obvious than other genera. It is at this point of union that the cell...
be found in great abundance on the linens, 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 life beyond the continent of Europe. The following is an analysis of the genera found by Mr. Ralfs in the British Islands:

- Plant an elongated jointed filament. Sporangia orbicular, smooth.
  2. *Delipropogonium*—Filament cylindrical, or sub-cylindrical. Joints with two opposite or dentate projections. (Fig. 1.) Two species.
  3. *Desmidium*—Filament triangular, or quadrangular; joints connected by a thickened border. Two species.
  4. *Aptogonum*—Filament triangular or plain, with formina between the joints. One species.
  5. *Sphaeosoma*—Filament plane, margins incised or sinuated; joints with junction-glands. Two species.

Froend simple from complete transverse division, distinctly constructed at the juncture of the segments, which are seldom longer than broad; sporangia spinous or tuberculated, rarely if ever smooth.

- *Microasterias*—Lobes of the segments incised or bidentate. (Fig. 2.) Thirteen species. Thirty-three genera. Sixteen species.
  6. *Xanthidium*—Segments compressed, entire, and spinous. (Figs. 4 and 5.) Six species.
  7. *Arthrodema*—Segments compressed, and having only two spines or mucros. Two species.
  8. *Staurostomum*—End view angular, radiate, or with elongated processes which are never gynemate. Forty species.
  9. *Delipomeadamum*—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.

Froend simple, from complete transverse division, generally much elongated, never spinous, frequently not constructed at the centre. Sporangia smooth.

- *Tetramorium*—Froend straight, constructed at the centre, and notched at the ends. Three species.
- *Penium*—Froend straight, scarcely constructed at the centre. Eight species.
- *Dioecium*—Froend straight, much elongated, constructed at the centre, truncate at the ends. Seven species.
- *Clorostomum*—Froend crescent-shaped or aruncate, not constructed at the centre. (Fig. 6.) Twenty-two species.
- *Sporoziella*—Froend straight, not constructed at the centre; endochromie spirally twisted. Two species.

- *Cells elongated, entire, fasciculated.*
- *Anhydremma*—Cells aggregated into faggot-like bundles. (Fig. 3.) One species. *Sporangia unknown.*

Froend composed of few cells, definite in number, and not forming a filament. (Fig. 7 & 8.) Eleven species.

- *Podostrium*—Cells arranged in the form of a flattened star, their outer margin bidentate. (Figs. 7 & 8.) Eleven species.

- *Bacillaria*—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 Desmidiaceae: Siebold, On Unicalcal Plants and Animals, in Misc. Journal, 1855; Meneghini, On the Animal Natural History Described, translated by Ray Society, 1854; A. Braun, On Rejuiemence in the Plant, translated by Ray Society, 1854; Lindley, "Vegetable Kingdom; Nügeli, Gattungen einzelliger Algen physiologisch und rassbachisch, Zürich, 1840; Cohn, On the Natural History of Protococcus platensis, translated by Ray Society, 1864.*
DETRINE. In this action the defendant could, until recently, in all cases retain the chattels which the plaintiff sought to recover, on payment of the damages awarded by the jury as the alternative of not giving them up to the owner. If the plaintiff, therefore, was desirous of recovering the very chattel itself, he was obliged to seek relief in a court of equity, which, on the palpable ground of being insufficient, interfered, and compelled the defendant to make a specific delivery to the plaintiff of his property. It is no longer necessary to resort to the Court of Chancery for the specific deliverance of chattels. Courts of Equity now have the same powers as the Court of Equity to enforce the specific delivery of the chattels recovered in the action of detinue. ('Common Law Procedure Act,' 1864.)

DEXTRIN. [CHEMISTRY, § 1; TISSUES, ORGANIC, § 1.]

DIANE/A. [FULMUNDAEA.]

DIASPOR. [MINERALOGY, § 1.]

DIASTASE. [CHEMISTRY, § 1.]

DIATOMACEE, or DIATOMITE, a group of organised beings which naturalists have placed in the animal vegetable kingdom, according to 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 siliceous pellicle or frustule, which is composed of silice or flint, and which remains 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; construct a cell or a vessel with the aid of a bivalve siliceous epidermis. Geminaries 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 Diatoms 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 work on 'Infruticous Animals,' says: 'We add to our knowledge of this family, and added to the forms that were already known. He regarded them, as well as the Demidie, 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 this position:—

1st. The Diatomacee exhibit a peculiar spontaneous movement, which is produced by certain locomotive organs.

2nd. A large number of them have in the middle of the interior of their cells a large round or oval nucleus, situated, which became coloured blue when placed in water containing indigo, just as many of the Polygastrics Infusoria. (fig. 19.)

3rd. The shells of the Diatomacee resemble in structure and conformation those which are seen in the Mollusca and other animals.

These arguments are met on the other side by the statement, that spontaneous movement is now known not to be specially animal, as the spores of many Algae, and their entire fronds are known to be actively motile. In the next place the colouring of the interior by indigo also takes place in truly vegetable structures.

The complex structure of the minute siliceous frustules of the Diatomacee is a fact that has struck many observers. Certainly it is without a parallel in the vegetable kingdom. Schleiden in his 'Principles of Scientific Botany,' after giving a minute analysis of the siliceous structure of Navicula viridis (fig. 6) represents this genus, says: 'Such an artificial and complex structure, and one that has no parallel, is entirely without significance. In all true plants we find the silica present in a very different form, as minute scales or drops, and distributed through the substance of the cell-wall. Again, in another place he says, 'This curious structure is wholly without a parallel in the vegetable kingdom, and cannot be derived from the laws of vegetation with which we are at present acquainted.'

More recently Professor Meneghini has come forward as an advocate of the animal nature of the Diatomacee. In a very lucid and remarkable essay, published at Venice in 1845, he says:—

'We must suppose them to be plants, we must admit every frustule, every navicula, to be a cell. We must suppose this cell with walls penetrated, a cell that has developed within another cell of a different form, at least in every case where there is an obvious peduncle or investing tube. In this silicious wall we must recognize a complication certainly unsealed in the vegetable kingdom. If we were still remain in the eminently nitrogenous internal substance corresponded with the gomitic substance, and that the oil-globules could take the place of starch. The multiplication would be a simple cellular deduplication (odopliantum), but it would remain to be proved that the two distinct primitive unicells or by the introduction or constriction of the wall itself. Finally, there would still remain unexplained how the frustules, not only vegetable, but even the probable ternary non-axillar composition of the external gelatinous substance of the peduncles and investing-tubes. But as the presence of nitrogen is not a positive character of animal nature, so the absence of it is not a proof of vegetable. And in order that the objection should really have some weight, it would be well to demonstrate that this substance is isomeric with starch. For then, supposing all the arguments in favour of the animal nature of the Diatomacee were proved by such a number of most circumstantial observations, this peculiarity, if it deserveth the name, will be regarded as an important discovery. We should then have in the animal as well as in the vegetable kingdom a ternary substance similar to that forming the basis of the vegetable tissue in the Dictyoneurum.'

Of the chemical composition of the Diatomacee little satisfactory has at present been made out. Professor Frankland of Manchester, according to the Rev. W. Smith, whose work on the British Diatomacee is one of the last that has hitherto been published, has found that a large amount of iron exists in the state of a silicate or protosilicate in the silicious frustules, which probably accounts for the brown or yellow colour of these organisms. On the application of external means to the shells, the shells become broken and their contents, and converts these from a golden-yellow to a bright green. On the addition of sulphuric acid they exhibit a deep brown hue.

The fact which is most relied on to support the vegetable nature of the Diatomacee, by those who advocate this view, does not appear to have been known to Meneghini, and that is the conjugation of the cells of which they are composed in the same manner as in the Dictyoneuro. [DEMIDIE, § 2.] This discovery was made by Mr. Tawseiles, and observed in the species of Eunana (fig. 19.), Fragilariopsis, and other species. This process takes place as follows:—Two individuals closely approximated deliquesce in the middle of their long diameter, whereby one of the individuals arises in one situation, and the opposite frustule. These indicate the future channels by which the endochron of the two frustules becomes united, as well as the spot where subsequently the double sporangium is developed (figs. 8, 19). From the sporangium the new individuals are developed. This process is precisely analogous to what takes place in the Dictyoneuro, so that the frustules of the Diatom must be regarded as cells of the same individual. "If we duly consider this," says Mr. Tawseiles, "which does it the lower tribes of plants in our estimation! since we may contemplate an individual plant of them not as the single phytos—not as the single frond—not as the single cell— but it may be as the aggregate thousands of these;—view it occupying as much space, and forming as much surface in the economy of nature as the largest forest-tree!"

The mode by which the cells are multiplied amongst the Diatomacee appears to be strictly in accordance with what occurs generally in the vegetable kingdom. This process is one of self-division. The first step is the fragment or division of the internal cell, "probably by the doubling-in of its membranous wall, and consequently the separation of the endochron, or cell-contents; the central vesicle or cytoplasm also dividing into two parts, which adhere to each other; these movements being simultaneous with a retrocession of the epidermal valves and the formation of the silicious connecting-membrane already described. In the centre of the enlarged frustule, in exact opposition to the original valves and closely applied to each other; these valves, covering the surface of the cell-membranes along the line of fission. The divided portions of the endochron
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 sparsely diffused." (Smith, p. 266.)

become solid except by crystallizing or depositing itself on some pre-existing substance. On the other hand, we cannot admit, with Nigelli, that it has been deposited externally for in many genera, and especially in the 

"Achaeanthids, the siliceous shield is covered with a very delicate, distal membrane, itself containing silica, as is proved by the observation of several authors on the action of silica 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 assume that the whole is cemented or intimated by silica. This permeation may occur either in the wall of a simple 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 or dissolves the matter and leaves the silica untouched; does not alter the apparent form of the organ, because the skeleton remains unaltered.

"Externally to the shield 

Nigelli observed a thin stratum which is 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 outermost "cement" seems to me the more important, inasmuch as even without resorting to the means indicated by Nigelli, 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 occurs in all. For to me it appears to appertain with that fine membrane of the 

Achaeanthids above mentioned, which, according to Kützing's own observations, is always visible whenever the two new individuals (in duos) that 

Diatom is resolved in its multiplication by d 

duplication (duplicationis) begins from points and lines supposed to belong to the subjacent shield 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 

Surirella, 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 examples of a different kind of analogy, namely, that with solid animal tissues belonging either to the internal skeleton or the external tegument.

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 an uniform language it is convenient to term these primary valves or surfaces which exhibit along the middle the line of division in the act of deduplication, which, since it is formed here in a normal manner, 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 marks variously formed but always longitudinal; these are termed vitre.

The lateral surfaces have frequently a rounded aperture of greater or smaller size in the centre, and from this a fissure extends outwards, sometimes only on one side, and sometimes itself gradually or expands into the regular terminal apertures. When this occurs each of these surfaces is divided into two distinct valves. On these lateral surfaces we observe the striae, longitudinal and transverse costae, no less admirable for their beautiful linear appearance than for their constant regularity in number, direction, and proportion. When many individuals are united together to form one compound being, like a polypl, for instance, it is always by the lateral surfaces that they unite; and since all other characters sometimes fail, we can affix to them the denomination 'lateral' from this principal one.

Besides the vitre before mentioned, in some general (Busk, fig. 15, Clathraaphos, Terpinoe) there are other solid ridges 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 its an arrangement to compare it with the shell of *Mollusca*. The *Aviculoidea* may be cited among the *Alveolaria*. Kölliker, in reply, that among vegetable cells there is found a peculiar conformation of the walls, with prominences, depressions, points, lines, papillae, and perforations, disposed in a regular manner; he refers to grains of pollen, as an instance. He might have added the more appropriate instance of the *Diatoma*, which could be very closely allied to the *Diatomae*, if the latter, like the former, could be referred to the vegetable kingdom. If not equal in constancy and regularity, the *Diatomae* display a greater degree of uniformity than the *Aviculoidea*, owing to the different nature of their substance, for in the vegetable cell, when lime or silica predominates, the wall becomes uniform and regular (l'unicorne ed irregolare)."

The siliceous 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 ocurrences. It has been said with justice that the examination of the 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, to the tubes which within are more or less "cristated." He also denies that there are any perforations in the valve, as supposed by Ehrenberg and Kölliker. These foramina are also denied by Schleiden. Mr. Smith denies also that the valves are externally covered with any organic membranes.

The delicacy of the markings on many of the *Diatomacea* render them objects peculiarly adapted for testing the powers of the object-glasses of the microscope. The following table, drawn up by Messrs. Solliet and Harrison of Hull, to whom microscopy is indebted for having first pointed out the nature of these objects, is presented by them at the meeting of the British Association at Hull in 1853:

<table>
<thead>
<tr>
<th>Species</th>
<th>Stria in inch.</th>
<th>Angle of Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navicula striatula</td>
<td>34,000</td>
<td>40°</td>
</tr>
<tr>
<td>N. Hippocampus</td>
<td>42,000</td>
<td>60°</td>
</tr>
<tr>
<td>N. Navicula</td>
<td>50,000</td>
<td>70°</td>
</tr>
<tr>
<td>N. limata</td>
<td>60,000</td>
<td>80°</td>
</tr>
<tr>
<td>N. angularia</td>
<td>60,000</td>
<td>80°</td>
</tr>
<tr>
<td>N. sertulosa (large)</td>
<td>70,000</td>
<td>90°</td>
</tr>
<tr>
<td>N. limata (small)</td>
<td>90,000</td>
<td>100°</td>
</tr>
<tr>
<td>Cassidula Fasciata</td>
<td>90,000</td>
<td>110°</td>
</tr>
<tr>
<td>Navicula proceritis</td>
<td>100,000</td>
<td>120°</td>
</tr>
<tr>
<td>N. arcus</td>
<td>130,000</td>
<td>150°</td>
</tr>
</tbody>
</table>

The *Diatomaceae* 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 matters, 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 elliptical 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 other half of its thinness." (W. Smith.)

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 account of a pedal or ostiate organ projected from the interior of the siliceous shield. The Rev. W. Smith has also detected cyclosis in the *Diatomaceae*. "A distinct movement," he says, "of the granular particles of the endochrome, closely resembling the circulation of the cell-contents in *Chara trichiata*, noted by Mr. Ralfs [Demidoff], and which I have frequently detected in the same species, has occasionally fallen under my notice in some of the larger forms of *Diatomaceae*. He has observed it in *Surirella hysterae.* This publication, after young did not, however, the regularity of movement so conspicuous in the *Demidoff*, and is of too ambiguous a character to furnish data for any very certain conclusions, save one, namely, that the *Diatom* must be a single cell, and that the repeated contents of separate organs, 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 partition."

The *Diatomaceae* are the most 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 estuaries. In fact, wherever a few drops of water are allowed to remain exposed to the air, we may expect to find forms of *Diatomaceae*. Their forms are not less abundant than their presence. In the first volume of his "Synopsis of the British Diatomaceae," the Rev. W. Smith has described upwards of 380 species, and the number of new species of *Diatomaceae* of British 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 from any river in the most remote district of the world may be expected to reveal a number of the abundant forms. They occur in great abundance in the river Thames, and its mud affords a large variety of the frustules of those which have ceased to exist. In a recent report on the Microscopic Examination of the Condition of Muddy Rivers, and other Water," by Dr. Lankaster and Rodem, 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 fast for a few hours, when, by carefully draining the water, the portion remains at the bottom of the vessel more turbid than the rest, and which generally contains in large numbers the objects sought for.

In describing the bowers of coloured dust which have occurred in various parts of the world, Ehrenberg has demonstrated that various forms of *Diatomaceae* 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 1841 the stones and pebbles in the nearly dried-up bed of the Annan, in Dumfrieshire, 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. On further examination, however, Dr. Lankaster found that it consisted entirely of the siliceous shields of a species of *Synedra*. (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. Dusk from Port 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 he made out fifty-five distinct species of *Diatomaceae*, twenty of which he 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—*Surirella*—and a number of new species are being detected nearly all the recent species described in this memoir in material obtained from the surface of the large sea-shells of the genera *Hipposoma* and *Haliaeita* before they have been cleaned. Many of them in this state are covered with small zoophytes, minute algae, and other minute organisms; thus presented to the naturalist are entirely new, and are 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-
The polishing powder or slate (polischief) found at Bilu in Bohema is used for the purpose of producing a polish or fine surfaces. This irregularity of the frustules of the Diatomae well adapt them to this purpose.

Another deposit in which the Diatomaceae have been found in great abundance is the Bergmeilh of Sweden (Bemsha, 5. 1.). The Diatomae found by Ehrenberg in this formation are principally species of Navicula. (Fig. 6.)

Amongst the tertiary deposits, beds of Diatomaceae 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 be built upon a stratum of Diatomaceous remains, 18 feet in thickness. (Smith, Professor Gregory of Edinburgh has recently described, in the 'Transactions of the Microscopical Society,' a Diatomaceous earth, discovered about two years ago by the Duke of Argyll in the Isle of Mull. It constitutes a soft bed, resembling marl in appearance, lying in a rough piece of ground between Loch Baas 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 Diatomaceous earth is probably of recent origin. Professor Gregory has sent a sample to the directors of the British Geological Survey, 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 will be seen that the subject of fossil Diatomaceae 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 of course be impossible here to give any account of individual species, and systematic arrangements are being constantly modified by new discoveries. The following is an arrangement of the families or tribes by Kitting:

Tribe I. STRIATA.

Order I. ASTRONAUTICA.

Without a central opening on the secondary valve.

- Transverse striae unbroken.

Family 1. Euonoe.
Family 3. Pogonaria.

** Stria broken (interrupted) in the median line.

Family 5. Survitellas.

Order II. SISTOMATIC.

With the central opening.

- Monostomatic.

Having a median aperture on only one of the secondary surfaces.

Family 6. Cocconeis.
Family 7. Achmea.

- Diatomica.

With a median aperture on each secondary surface.

Family 8. Cymbelina.
Family 9. Geitlerin.
Family 10. Navicula.

Tribe II. VITTATA.

Order I. ASTRONAUTICA.

Without central opening on secondary side.

Family 11. Licmophora.
Family 12. Striatelles.
Order II. Stemataceae.

With a large distinct aperture.

Family 13. Tabulariaceae.

Sub-Tribe 1. Connecting membrane subperisent as a siliceous annulus; frustules after self-division united into a cylindrical filament.

3 Genera—

1. Tabellaria... 2 species.

2. Amphipteris... 1 species.

3. Biddulphia (fig. 15)... 4 species.

1. Iaithia... 2 species.

Sub-Tribe 2. Membrane subperisent; frustules after self-division united into a anatomous enclosure.

3 Genera—

1. Podoloria... 2 species.

2. Melolipus (fig. 16)... 6 species.

3. Orthoria... 6 species.

Sub-Tribe 3. Frustules invested with a gelatinous or membranaceous envelope.

1. Family 17. Dictyodonteae.

Family 18. Anciaceae.

Family 19. Actiaceae.

The Rev. W. Smith, in his 'Synopsis of the British Diatomceae,' gives the following arrangement of the genera:

Tribe I. Frustules naked; not imbedded in gelatinous nor inclosed in membranaceous tubes.

Sub-Tribe 1. Connecting membrane deciduous; frustules solitary, or during self-division in pairs; rarely in greater numbers, adherent or free, dispersed, or aggregated into a mucous stratum.

22 Genera—

1. Epiactis (fig. 19)... 16 species.

2. Exarata (fig. 1)... 7 species.

3. Cymbella... 6 species.

4. Amphora... 8 species.

5. Cocconeis... 6 species.

6. Coecinodiscus... 3 species.

7. Euxipho (fig. 2)... 6 species.

8. Actinocyclus... 1 species.

9. Arachnoides... 1 species.

10. Tetracrinum (fig. 3)... 4 species.

11. Cyclotella... 4 species.

12. Campylodiscus... 7 species.

13. Sardinella (fig. 4)... 20 species.

14. Trybliionella... 6 species.

15. Gymnocalveolus... 6 species.

16. Nitzschia... 23 species.

17. Amphiporella... 5 species.

18. Amphipora... 2 species.

19. Navicula (fig. 6)... 36 species.

20. Pinnularia... 24 species.

21. Staurotesta... 10 species.

22. Pleurosigma (fig. 7)... 25 species.

Sub-Tribe 2. Connecting membrane subperisent; frustules after self-division attached by a gelatinous cushion, or dichotomous striæ.

7 Genera—

1. Synedra (fig. 5)... 24 species.

2. Daphora... 2 species.

3. Cocconema (fig. 6)... 4 species.

4. Dicranoma (fig. 9)... 12 species.

5. Podaphora... 5 species.

6. Haplophora... 2 species.

7. Loxophora... 2 species.

Sub-Tribe 3. Connecting membrane evanescent, or obsolete; frustules after self-division united into a compressed filament.

15 Genera—

1. Morsella (fig. 10)... 2 species.

2. Bacillaria (fig. 11)... 1 species.

3. Hinnaitestia... 7 species.

4. Odontidium... 4 species.

5. Denticula... 4 species.

6. Fuwaria... 3 species.

7. Encostoma... 1 species.

8. Achnanthes (fig. 9)... 6 species.

9. Diademia... 3 species.

10. Rhabdomor... 2 species.

11. Sertularia (fig. 12)... 1 species.

12. Tetracyclus... 1 species.

Sub-Tribe 4. Connecting membrane subperisent; frustules after self-division united into a zigzag chain.

6 Genera—

1. Diatoma (fig. 14)... 4 species.

2. Grammatophora... 2 species.

3. Tubellaria... 2 species.

4. Amphipteris... 1 species.

5. Biddulphia (fig. 15)... 4 species.

6. Iaithia... 2 species.

Sub-Tribe 5. Connecting membrane subperisent as a siliceous annulus; frustules after self-division united into a cylindrical filament.

3 Genera—

1. Podoloria... 2 species.

2. Melolipus (fig. 16)... 6 species.

3. Orthoria... 6 species.

Sub-Tribe 6. Frustule indefinite; mammillate; frustules scattered.

1. Mastogloia... 3 species.

Sub-Tribe 7. Frustule definite; compressed or globular; frustules scattered.

2 Genera—

1. Dickoria (fig. 17)... 3 species.

2. Berkleopora... 1 species.

Sub-Tribe 8. Frustule definite; filamentous; frustules in rows.

3 Genera—

1. Encosoma...

2. Colleoma...

3. Schizosoma (fig. 18)... 16 species.

Sub-Tribe 9. Frustule definite, filamentous; frustules fasciulated.

1. Homoeocladia... 3 species.


DIBDIN, REV. THOMAS FROGNALL, the most conspicuous English writer on Bibliography in the earlier half of the nineteenth century, was born at Calcutta in 1776. His father, Captain Thomas Dibdin, the commander of a sloop of war in the Indian Ocean, was the elder brother of Charles Dibdin, the celebrated naval song-writer. [Jems, Caxton.] Both he and his wife, whom he had first met in the East Indies, died on their passage home in the year 1780, and Froggall Dibdin first landed on the English shore an orphan of four years old. His mother's brother, Mr. Compton, took charge of him from that age to man's estate; and of other relations he saw so little, that, he tells us in his 'Reminiscences,' he conversed with his famous uncle Charles but once in his life, though Charles lived till 1814, when Frognall was eight-and-three, and was sent to St. John's College, Oxford, but quitted the university without taking a degree, and studied the law under Mr. Basil Montagu, whose office he left to practise in the unusual character of a provincial counsel at Worcester.

Finding no prospect of success, he soon abandoned the law for the church; and a passage in his 'Reminiscences,' in which he describes his studies, furnishes the key-note of much of his subsequent career. "In Greek Testaments my little library was rather richly stored. I revelled in choice copies of the first Erasmian, and of the first Stephanus, and defied any neighbouring clergyman to match me in Elzevirs and in Tossorin." In London, to which he speedily returned, and where he became a preacher at some fashionable chapels at the west-end, he was less known in the clerical than in the literary or rather the bookselling world. At that time, the "bibliomania," as it was called, or fancy for purchasing rare 2 A
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 1812, where a copy of an early edition of Boccaccio, printed by Vrba in Venice in 1471, was bought by Mr. B. R. Haldorn, afterwards Duke of Marlborough, for the sum of £260; 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 the price placed upon it. This was mentioned in the Notice.

Dr. Dibdin proposed, at a dinner party at Baron Bolland's, even before the Valaderf was sold, the establishment of a club, to dine together in honour of Bibliography. The club was formed on 17th May, 1817, and was named the Roxburghe Club, and he became the first vice-president. This club afterwards adopted the rule that each of its members should yearly 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 the 'Young Man's Guide to the Laos of France and Germany,' in 2 vols., 1811; and the Bibliographical Decameron, in 3 large vols., in 1817. A new edition of Aesop's 'Typographical Antiquities' was also commenced by him, but was not completed until 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 'Archive Althorpiana,' a description of Earl Spencer's seat at Althorp, in Northampton; or, 'Young Man's Guide to the Old Man's Commonplace in the Choice of a Library' (1824), he apparently appreciated 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 resented 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 the post of Earl Spencer's librarian, and was introduced to the church—the living of Exning, near Newmarket; he was afterwards appointed to the rectory of St. Mary, Bryanston Square, London; and his publications for some years were chiefly of a theological character. He returned to the field of literature with his Reminiscences of a Bibliomaniac (2 vols., 1830), 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 18th of November 1847, after a long illness, of paralysis of the brain. His latter years had been much clouded with pecuniary difficulties.

Many 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 Amos Dibdin, the subject, professing to give 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 a new one. But little room for extensive improvement on Herbert—a very great alteration even in the arrangement would have much increased its value to nearly all who consulted it. The titles of the books are given in two ways, first under the name of the printer, and then under the name of the publishers: had they been disposed instead, according to the plan adopted for the '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 inaccessible. It would have been far from uninteresting 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 Shakespeare first came to London. Dibdin has preserved the old arrangement, but has made the Mendelssohnian mistake of giving the marginal numbers 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 the presses, but it is crowded and more or less common to 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 character of the 'Decameron' is preserved in the 'Reminiscences' from the manuscript 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 which he has 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 the first to the last, isprodigious, with little to do to the public in general, is often used as a work of reference: but those who have consulted it the oftener regard it with the most distrust. Such was Dr. Dibdin's habit of inaccuracy, that he is not at all unlikely to have regarded the English nobility of the name of 'Decameron' as 'the English version of the Decameron,' and to have given the story of the date of the latter as being 'on the evening before the sale of the Boccaccio of 1471, which took place on the 17th of June, 1512.' It may easily be conceived that his accounts of the dates of rare books are not to be depended on till after they have been verified. It may be remarked also, that the object of describing a book has 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 bound, attract as much of his attention as the matter of the book; which all copies of the book have in common. The 'Decameron' are a singular compound of anecdotes of rare interest mixed up with the most idle and irrelevant matter. The 'Decameron' is by far the best of Dr. Dibdin's works, as comprising the least of the detail and the most of the anecdote; and it is often in many portions with a degree of care and spirit often wanting in his other works. The 'Reminiscences' afford singular proof of that, although the author of an 'Introduction to the History of Printing' in England, first of its kind, and more than usually deficient. On the whole, though his 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 mentioned in the 'Reminiscences.'

DICHROITE. [MINERALOGY. S. 1.]

DICK, THOMAS, LL.D., was born in 1772. He was educated for the Christian ministry in connection with the Secession 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,' which 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 As Well as the Theory of Christian Beneficence, contrasted with Covetousness,' written in competition for the prize which was conferred on Dr. Harris for his work, entitled 'Mammon;' or Covetousness and its Effects,' which was written in a singularly unobjurgative disposition, and was content 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 in the hands of those who obtained them from them. 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 Dundee, 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 Drought, Perths, on the left bank of the river
Tay, in Forfarshire. Besides instructing the public 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 a small pension was granted to him by the govern-
ment in acknowledgment of his services in the advancement
of popular sciences. He died July 29, 1837.

DICTYOGEN, B. a class of plants, proposed by Lindley, and
adopted in his Vegetable Kingdom. It seems to be
remarkable for the wide distribution of its species among
the larger classes of Exogens and Endogens. They have a monocotyledonous em-
by, but they have also a broad net-veined foliage, which
usually disarticulates with the stem. The following are the
natural orders of Dictyogenae: —

- Trivirgataceae.
- Discocasaeeae.
- Smilaceaeeae.
- Phaceszaeeae.
- Trillabeceae.

Flowers unisexual. Perianth free. Carpels
00; one seed.

Flowers unisexual. Perianth adherent. Carpels consolidated; several seeds.

Flowers bisexual. Carpels several, quite consolidated. Placenta axile. Flowers hexagonal, apetalous.

Flowers bisexual. Several carpels, quite consolidated. Placenta parietal. Flowers 3-6-petaloides.

Flowers bisexual. Several half consolidated. Placenta axile. Flowers 3-petaloides.

Flowers bisexual. Carpels solitary, simple, many-seeded, with long-stalked ana-
tropol seeds, and a basal placenta.

DIYIMUM. [Corym, S. 1.]

DIDYMOPIRUM. [Dicyphy, S. 2.]

DIEGO, SAN. [Canada, S. 2.]

DIGENITE, a native Sulphur of Copper.

DILMAN, a town in Perú, is situated on the caravane route from Trabiz to Erzerum, 70 miles W. from Trabiz, 20
miles W. from the north-west angle of Lake Urmiah, and
has about 16,000 inhabitants. It is situated in the wide and
fertile plain of Selimias, 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 it, and from the great size of some of them, it appears
an able extent, and it is described by St. Martin as being a very
ancient Armenian city. (Colonel Sheil, in London Geogra-
phical Journal, vol. vi.)

Birds. Several species 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 meet-
ing of the Zoological Society of London, the fragment of
the shaft of a femur, 6 inches in length, and 2 inches in its
smallest circumference, with both extremities broken off.
This bone of an unknown struthion bird of large size,
assumed to be extinct, was put into the Professor’s hands
for examination by Mr. J. E. Nelson, of New Zealand, who
had recently been in New Zealand, where the natives have a tradition
that it belonged to a bird of the eegle kind, which hasecome extinct, and to which they give the name Movie or
Mouse. Similar bones, it was said, were found buried on the
banks of the Waikato.

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
structure into which it is inserted, at the middle of the shaft, where the parietes of the medul-
lar or rather air-cavity, are smooth and unbroken. From
this difference I conclude the struthion bird indicated by the
fragments was not the heathen, of the sloughy species than the ostrich; its femur, and probably 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 subcompressed, 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 struthion birds are more massive than those of the
great species, to daphoenus, are solid throughout; those of the crocodile he indicates the structure
like the present bone. The cancellous structure of the mamma-
rous long bones is of a much finer and more fibrous character than in the fossil. Although I speak of the bone
under this consideration, I believe it to be observable that it does not present the
characters of a true fossil; it is by no means mineral-
ised; it has probably been on or in the ground for some
time, but still retains most of its animal matter. It weights
7 ounces 12 drachms avoirdupois.

The discovery of a new struthion 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 ano-
malous genera of the struthion order; and because of the
close analogy which the event indicated by the new fossil
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 may be so called, was at least as well adapted
nearly resembling those of the Dodo than of any of the existing Struthionidae. Any opinion however as to its spe-
cific form can only be conjectural. The femur of the Stilt-
Bird (Himantopus) does not reveal the anomalous development of the other bones of the leg, but as 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 struthion 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
capacity 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, pelvis, &c., were transmitted by the Rev. W.
Williams to the dean of Westminster (Dr. Buckland); and
in 1846 many specimens were sent to England by Dr.
Macmillan, 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 sent over from New Zealand contained the remains of no less than a remarkable group of birds, which he at first supposed belonged to the family of Struthionidae. Subsequent examina-
tion however has led Professor Owen to the conviction
that, although the two birds are not closely connected 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 gigas, and he determined that the height of the male had been from 10 feet to 10 feet 6 inches. The other species described were — D. ingens, attaining a height of 9 feet; D. struthoides; D. dactylopus, 4 feet; D. dromomæus, 5 feet; D. struthiodgacaudatus, 6 feet. In addition to these were described — D. curtus, D. croesus, and D. caurinus. Thus 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 Emen, and the Ostrich, all of which

On a subsequent examination of the bones of D. ingens and D. dromomæus, Professor Owen discovered a back toe which he had seen nowhere in the other species, and for these he proposed the generic name Palæopteryx. To these birds was added the skeleton of D. curtus. Dr. Mantell gives the following account of 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,
explore known every 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
genera, or others, had been formed, from the following facts;
that every bed of a loose bottom, almost 100 feet thick, covering a deposit of finely-laminated
sand, which covers a thick stratum of blue clay full of shells.
The conglomerate consists of pebbles and large boulders of
an inch or more in diameter, which are almost entirely of the
most visible bed; the shells it contains are marine, and
ressemble 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
lakes of which the bones of the Waikato are deposited, and
this on my first visit was strewn with bones of men, moa
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 Kurata, Z. diversi, the
to the same level as the flat on which I had observed the strew
fragments of bones I came to a regular ossiposiferous deposit.
The bones however perfect were as soft and plastic
as putty, so that if grasped strongly they changed as it were
by magic into pieces; and it was necessary to dig them up
with great care, and expose 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 the
bones, and destroying them. I was in a state of great anxiety,
lest I should without any notice I might have observed I
myself, or any one else, have overlooked any bones. The
end of the bones I had seen. The work was easier than
expected, and of a number of bones has been collected.
The chief part of this collection is now deposited in the
British Museum.

The locality from which these specimens were obtained is
described by Mr. Mantell:—"Near Waikorati, 17 miles
north of the head of the Waikato, and three-quarters of
a mile in length and 150 in height; it consists of sandy
clay distinctly stratified and traversed by
dikes of columnar trap, the columns being at right angles
to the layers of clay. In a little sight, south of Island
Point, on the side of the Waikato, the marl, which
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 turbar deposit, whence bones of Moa
and other birds of various kinds have been obtained in such
large numbers 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
otherwise denoted by vegetation, and appears to be of a very limited
extent; the bed is entirely subaqueous, and only visible when
the tide has receded. It consists almost wholly of decayed
vegetable matter, and its surface is studded with the undis-
turbed 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 odour when first collected; from the large quantity of
animal matter it contains I conceive it was originally a
swamp or morass, in which the New Zealand Flax (Phormium
tenax) grew in larger plantations than the piper, not not by the
first layer of sand when exposed at low water... Although
bones of several species of Moa, especially of the largest
kinds, have been collected from this locality in considerable
numbers, and in great perfection, yet as the bed is rapidly
diminishing from the land to the sea, and the exportation
of bones by the tides, I fear that it will be entirely washed away, without yielding
to the palaeontologist all the desired information respecting
the extinct animals whose relics it enshrines; for the natives
and whalers are well aware of the interest attached to the
bones by Europeans, and they seize 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 capricity and avarice have
too been so much indulged by the latter, that casual visitors, that the cost of specimens has increased to an unreasonable amount."

In their general aspect the bones which have been obtained from these spots closely resemble those obtained from the
oosiferous cavans in Germany. Professor Cotta gives a
analysis of their chemical composition, and from this infers
that they may have been recently deposited. Mr. Mantell
describes the bones also from North Island:—"On the western
shore of the Hokianga, about 30 miles north of the mouth of
the river; the Waipoua, for a distance of 40 miles, has a
complete canal for the small boaters at the back part of
the proximal end of the taro-metatarsal; the perforation
above the interspace between the outer and middle meta-
tarsals for the tendon of the adductor muscle of the fourth
toe, and the more distal part of the sole 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 specific name A. oblonga, "taro-metatarsal..."

With the remains of the bones found on the banks of
the river Waikorati were mixed the fragments of egg-shells.
The eggs to which the fragments belonged were supposed to
belong to a species of bird similar to those about
subject to the recent discovery of a large egg in Madagascar
is interesting.

In a report to the French Académie de Sciences, M. Indres
Geoffroy St. Hilaire described three enormous fossil eggs
existance of a line of cliffs which extends inland, and has
manifestly been produced by the corrodion action of the
river. Driven from its course probably by a change in the
relative level of the land and sea, a stream of waterains its
course. If for instance a bed of loose soil has formed
its rate, 100 feet thick, overlying a deposit of finly-laminated
sand, which covers a thick stratum of blue clay full of shells.
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Geoffroy St. Hilaire described three enormous fossil eggs
from Madagascar, and some bones belonging to the same bird. The captain of a merchant-ship trading to Madagas- 
car, who had a very large collection of specimens of Psopho-
notornis giganteus, which is one of the birds found in 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 
memorials referred to with the following general remarks:—
The extraordinary number of wingless birds and the vast 
number of the peculiar 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 conti-
ent over which this singular Struthion-Fana formerly roamed. One might almost be disposed to regard New 
Zealand 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 Sandstone 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 
Zealand has progressively subsided, and now lies beneath the 
Pacific Ocean.”

(Own, Memoirs on the Dinornis; Zoological Tran-
sactions, vol. iii.; Owen, Proceedings of Zoological Society, in 
Annals of Natural History; Mantell, Fossil Fossils and their 
Teachings.)

DIOMEDÉEN, a family of birds, to which the Alba-
crese belong. The characters of the genus Diomedea are 
given under ALBATROS. In that article three species of this genus are 
recorded. We give a complete list of the 
species of this important genus—

D. diomedea, Linn. This bird is abundant between 
30° and 60° S. lat., and equally numerous in all parts of 
the ocean bordered by those degrees; its range, however, 
extends much farther south, even to within the antarctic 
circle.

D. melanophris, Temm. It is the most abundant species 
of the southern seas; equally numerous in every part between 
the 30th and 60th degrees.

D. caieta, Gould. This species was procured by Mr. 
Gould off the Island of Van Diemen’s Land.

D. chlororhyncha, Lath. It occurs between 30° and 60° 
S. lat., in both the Atlantic and Pacific Oceans.

D. culminata, Gould. This bird is rather abundant both in 
the Pacific and Atlantic Oceans, between 30° and 60° S. 
lat.

D. fuligina, Gmel. It occurs in all parts of the ocean 
between 30° and 60° S. lat.; equally common off Van Die-
men’s Land, Cape Horn, and the Cape of Good Hope.

D. brevipes, Gmel. In the North Pacific Ocean.

D. gibbons, Gould. An inhabitant of the North Pacific 
Ocean.

D. olivacea, Gmel. China seas (?). Mr. Gray, in his ‘Genera of Birds,’ also 
lives D. spectabilis as a species. It is abundant in the Atlantic Ocean, with 
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DIOPSIDE. [A.QUITA.]

DIPHTHERITE. [MATERIA MEDICA, S. B.] DISRAELI, ISAAC, was born at Enfield, Middlesex, in 
1766. His father, Benjamin Disraeli, was the descendant of 

D. fuligina, Gmel. It occurs in all parts of the ocean 
between 30° and 60° S. lat.; equally common off Van Die-
men’s Land, Cape Horn, and the Cape of Good Hope.

D. brevipes, Gmel. In the North Pacific Ocean.

D. gibbons, Gould. An inhabitant of the North Pacific 
Ocean.

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a family of Spanish Jews, who, driven from the Peninsula in the 
10th century by the persecutions of the Inquisition, had settled 
in Venice, and there, to mask their race, had exchanged the 
Gothic Spanish name they had hitherto borne for that of 
Disraeli—"a name never borne before or since by any other family 
(the name was originally written D’Israël; but in his later years the subject of this memoir was in the habit of 
omitting the apostrophe). He had come over from England 
and from Italy in 1748, and made a considerable fortune by 
commerce. He married in 1765 "the beautiful daughter of a 
family" of his own race "who had suffered much from persecution. "She was a person of strong sense but no 
esthetic or fancy for fancy, and in the main a useful woman, of 
her race." The only child of this union was the subject of our 
notice. His sensitive and poetic character as a boy puzzled 
both his parents, and, in particular, occasioned continual 
complaints from his father, that he and his mother had 
"bred a fool, and thus ruined him and the family to the 
ruin of his sight and fortune." But from the first he showed 
a decided aversion to an active life. Educated first at a school near 
Enfield, and then at Amsterdam, where the only advantage 
he received was that derived from access to a large library, 
he was not more than eighteen when, in spite of all that his
father could say or do, he signified his intention of being a literary man. "He had written a poem of considerable length, which he wished to publish, against commerce," his father naturally opposed this intention, and accordingly on one occasion "Dr. Jarratt, in the statement of his case, complaining that he had never found a counselor or literary friend. He left his packet itself at Bolt Court, where he was received by Mr. Francis Barber, the junior, in a black servant's dress, to call for, 'two or three times a week.' When he did call the packet was returned to him unopened, with a message that the doctor was too ill to read anything. The doctor, in fact, was then on his deathbed. In 1788 Dianas's father sent him to travel in France. On the way he met Dr. Maitland, a shadowy Chartist. At some point in the conversation he ventured anonymously to publish by way of corrective some verses "On the Abuse of Satire," which Walcott attributed to Hayley. About this time he became acquainted with Mr. P. F. afterwards poet laureate, who was of service to him in many ways, and who persuaded his father to allow him to follow his own inclinations. Accordingly from about 1790, without any further opposition on the part of his family, and with sufficient means supplied by his father (who survived till 1819, when he was nearly ninety years of age), he was free to devote himself entirely to literature. His first efforts were in poetry and romance. His early verses are forgotten; but a volume of romantic tales, including one called 'The Loves of Me neuen and Loo.' Some time after this, in the middle of the 18th century, a second edition appeared. But though he had a poetic taste, he was not fitted to be a poet or creative writer; and he was not long in finding out that his true vocation was in the history of society. A series of works illustrative of its literary and political history he could call "several other words," and these were researches in literature and history and gossips. 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 walk which had there entered upon. Accordingly, with the exception of the volume of romance above alluded to, and we believe, one or two other anonymous publications, all Mr. Diaries's further productions during his long life consisted of the fruits of his literary labors. These researches 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 six volumes, published in 1789, 1790, 1797, 1806, 1807, of six volumes); or as independent publications. Among these independent publications may be mentioned his "Essay on the Literary Character" originally published in 1790; his "Anecdotes of Literary Controversy," and his "Inquiry into the Literary and Political Character of the First."—works originally published between 1812 and 1822, and since then published collectively under the title of "Miscellaneies of Literature;" and his "Life and Reign of Charles the First," published in five volumes at 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 Patrick Colquhoun," and had collected materials for both; but a paralysis of 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 "Amunities of Literature." His last years were spent in revising and re-editing his former works; and he died in 1843 at the age of 82. "He was," says his son, from whose memoir prefixed to a new edition of his "Curiosities of Literature," "a character of the literary character, a man who really passed his life in his literary labors. Even marriage produced no change in these habits: he rose to enter the chamber where he lived alone with his books, and tea was served in the same "wainscots." In his old age his appearance changed, he became more mild and venerable; he had then become rather corpulent.

Diss. [Norfolk.] "Divorce. The subject of the law of divorce has for several years engaged the attention of the legislature, and a commission having been appointed to consider the question, made a report which was presented to both houses of Parliament by command of Her Majesty in 1833. The statute 30 & 31 Vict. c. 56, which came into operation on the 11th day of July, 1835, has completely altered the recommendation of the commissioners into effect. For information as to the previous state of the law, see Divorce.

In the first place the jurisdiction in matters of divorce and causes connected therewith is in the High Court of Justice, which consists of the Lord Chancellor, the Lord Chief Justice of England, the Lord Chief Justice of the Common Pleas, the Lord Chief Baron of the Common Bench, the Lord Chief Justice of the Court of Exchequer, the junior puisne judge in each of the three Common Law Courts, and the judge of the Court of Probate. In the last-mentioned functionary is entitled the 'Judge Ordinary of the Court of Divorce and Matrimonial Causes,' and he is invested with power to determine alone all matters, except petitions for dissolving or annulling marriage, applications for new trials, bills of exception, special verdicts, and special cases.

The Act abolishes the old decree of divorce a mensa et thoro, but enables the judge to pronounce a sentence of 'judicial separation,' which is nearly the same thing, and which sentence may be obtained either by husband or wife, and is a sentence which, if not barely a separation, is a cause for two years or upwards. Desertion was not a ground for legal separation under the old system, which only offered to the party wronged such remedy as was afforded by a decree for the restitution of the community of property. The Act also contemplates that in the sentence of judicial separation has over the old divorce a mensa et thoro, consists, however, in this, that from the date of the sentence, and whilst the separation continues, the wife is considered as a feme sole with respect to her property, if every demand of the separation may be put an end to, either by the reversal of the decree or by the mutual consent and actual cohabitation of the parties, but in the latter case the property of the wife acquired subsequently to the separation is still held to her separate estate, if she consents to cohabit. The husband and wife may enter into while separate.

Applications for judicial separation and restitution of conjugal rights may still be made as before. The statute goes as far as to provide that a marriage may be put an end to, either by the reversal of the decree or by the mutual consent and actual cohabitation of the parties, but in the latter case the property of the wife acquired subsequently to the separation is still held to her separate estate, if she consents to cohabit. The husband and wife may enter into while separate.

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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 crim. con, being abolished by the statute. The adulterer may also be condemned in the costs of the whole proceedings.

After a decree 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, clergymen of the established church are not compulsory to perform them, he was afterwards released from the bonds of a former marriage. 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 course is regulated.

DOBRENTÉI, GABOR or GABRIEL, an Hungarian author and antiquary of distinguished merit, was born at Nagy-Szőlős, in the county of Vasprám, in 1766. He showed very early not only a remarkable zeal for the Hungarian language and literature, but a singular social talent for enlightening others in his views. At Eödesen, 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 auspices, the Hungarian Transactions was published. At twenty he studied at Witttenberg and Leipzig, and in 1807 was recommended by Kinczyczy, then the almost acknowledged head of Hungarian literature, to the post of tutor to the Exiles of Leopold, which made him for some years 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 on foot and edited a magazine, the Exilés' Museum, of which the first number was issued at Klansenburg 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. Pesth was his permanent residence for the remainder of his life, 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 used in his valuable productions. Correspondence was exchanged with Miss Padroe for her account of Hungarian literature and authors in her 'City of the Magyar,' and he wrote the article on the subject in the Leipsie Conversations-Lexikon, which, by its being translated into the English and French Encyclopedias, and the translation reprinted in the Glasgow Popular Encyclopaedia, has become familiar to thousands of English readers. As a poetical writer, Dobrentei was not successful; his original poems appear to have been pleasing, but no more; and though his translation of Shakspere's Macbeth was acted at Brussels 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 Hungary for the more successful pen of a lady, Emilie Lemoine, who in 1832 translated the whole 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 country, but more numerous, a noble project, but being frustrated the post to take that of one of the secretaries of the Hungarian Academy in 1833, of which he was also a zealous promoter.

Kohli, the traveller, bears testimony to the extraordinary influence of these establishments on the whole tone of the Transylvanian aristocracy, and an imitation of the modern style in art was imitated on a small scale. In 1837 Dobrentéi received an intimation from the government that his holding the post of secretary to the Academy any longer would be incompatible with his occupation as a member of the circle of the editorship of his great work, the 'Regi Magyar Nyelvemlékek,' or 'Ancient Monuments of the Magyar Language,' the first volume of which, a substantial quarto, was published at Buda in 1825, and the fifth was in process of publication at the time of Dobrentéi's death. His labours on this work were the delight of his life, he pursued them with irrepressible ardour, and on the result his reputation rests securely. When he began, hardly anything was known of the history of the Magyar language and literature, and in his study in darkness he left environed 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 as eager in obtaining permission to copy and make use of them, as if he was himself the owner of a rare and costly manuscript. 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 his works of literature and history of the greatest importance to Dobrentéi's 'Nyelvemlékek,' 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, Count Stephen Széchenyi, became a maniac. Dobrentéi was still engaged in collecting materials for his great work when surprised by death on the 27th of March 1851, at the age of 65. He was the author of numerous lives of Hungarian worthies, and in 1839 he published for which he contributed in the 'Eszterházy Társ,' or Hungarian Journal, of the Leipsie Conversations-Lexikon, with original additions to the Hungarian articles, and in editions of Berzenyi and other authors published under his superintendence, but the work of himself appears to have been published since his death.

DOBUDRUSKA, a district in European Turkey, forms the north-eastern part of Bulgaria, and comprises the country north of the eastern rampart called Trajan's Wall, between the Danube on the north, and the Black Sea on the south. Trajan's Wall leaves the Danube between Rasova and Csernava, and runs across to the Black Sea a little south of Kustenje, a distance of about 35 miles. In its western part the work is a small stream, the Kara-Su (Black Water), that connects with another extended to the Danube above Csernava. At the head of the valley of the Kara-Su, near Bourik, a line of hills or downs, composed chiefly of a porous limestone rock, runs north and south 164 feet above the level of the Black Sea. Along the coast at Kustenje also there is an uninterrupted range of low hills and cliffs, so that it is certain the Danube never had an outlet across the Dobrudjaka in this direction. The formation of a canal from Csernava to Kustenje has been long a subject of speculation, and in the summer of 1848 a canal of porous limestone, no water ever rests to feed such a canal if it were cut. Besides, the only water communication between these two points that would be of much use would be a ship-canal, but even in these words, the opening of a new bed for the Danube; and this the nature of the ground renders all but physically impossible.

The low undulating down runs northward all through the Dobrudjaka, forming a small watered rift between the Danube and the sea; on the north it joins a lofty mountainous mass, which covers the north of the district between Baba-Dagh and Matchin. On the eastern side the Dobrudjaka is marshy, and contains several lakes. There is a great scarcity of drinkable water in this district. It contains however many great lakes, although in the hot season of the year, like all the countries near it, it resembles a desert. In the spring, on the melting of the snows, the soil is saturated with wet, and in most parts is converted into a sea of mud. The inhabitants are chiefly Bulgarians, Greeks, and Turks, the latter who rear sheep and buffaloes. Eagles, ostriches, cranes, wild geese, partridges, kites, ducks, wild swans, and wild dogs, are extremely numerous in the Dobrudjaka. Along the Danube are the fortresses of Hirsova, Matchin, Isaakitch, and Tulca, although in the interior of the town of the Danube, which forms part of the boundary between the Dobrudjaka and Russia. In the interior is the town of Baba-Dagh, between the mountains of that name and Lake Rasov. Kustenje is a mere village. In 1804 a Turkish army fell back to the fortress of Silistria, where they defended themselves successfully.

DOG-PIGH. [SQUALILO.] DONINGTON. [LEICESTERSHIRE.] DONINGTON, CASTLE. [LEICESTERSHIRE.] DONIZETTI, GAETANO, was born September 25, 1798,
at Bergamo, in Northern Italy. He studied in the Lyceum of that town, and his father having originally destined him for the Church, he received a good classical education and then proceeded to musical studies. He received his first instruction at the Musical Institute of Bergamo, of which Simone Mayer was then director. Here he remained three years, and in 1816 he moved to Boigny, where his musical education was completed. He then went to Maastricht, and entered the army. He dedicated his life to music. In 1818 he published his first opera, 'Enrico di Borgoja. He continued to write for the stage and was a frequent visitor to his home in Milan. His earliest works, however, are forgotten, or at least are no longer performed, and it was not till 1830, 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 over 130 operas, and the four years from 1844 to 1847, when his last opera, 'Catarino Cornaro,' 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 more fortunate productions may be mentioned 'Anna Bolena,' Milan, 1830; 'L'Elixir d'Amore,' Milan, 1833; 'Lucrècia Borgia,' Milan, 1833; 'Marino Faliero,' Paris, 1836; 'Lucia di Lammermoor,' London, 1835; 'Le Roi d'Ys,' Paris, 1836; 'El Fille du Régiment,' Paris, 1840; 'La Favorita,' Paris, 1840; 'Linda di Chamouni,' Vienna, 1843; 'Don Pasquale,' Paris, 1843; 'Maria di Rohan,' Vienna, 1843. Most of these later operas, besides his usual grace and facility, exhibit a certain amount of melodic interest, and some degree of construction and skill in instrumentation, much superior to his earlier productions. His artistic powers were thus manifestly improved and expanding towards the termination of his musical career. Soon after the performance of his 'Lucia,' which excited great 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 1844, which was the year of mental labor, he described all those vices and habits of intemperance, began to show themselves, and he was for some time in a lunatic asylum. In October 1847 he was removed to his native town of Bergamo, where he died on the 9th of April 1848. (Neuvième Biographie Générale.)

DONOSO CORTÉS, JUAN, an eminent Spanish statesman and author, was born in 1609, 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 entered upon a 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 contrary to the constitution. Having been Igno 10, 1822, when the temporary revocation by Ferdinand of the decree for the succession of the present Queen Isabel awakened the apprehensions of the liberal party that all political liberty was at an end, he was sworn a member of the principal young men of Madrid waited on Queen Christina to offer her their lives in defence of the rights of her infant daughter, and at their head was Donoso Cortés. From this time he was distinguished by the favour of Queen Christina, and entered upon a 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 contrary to the constitution. Having been imprisoned for some time he was called to 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 that of the Quadruple Alliance.'

In 1833 he was sent as a royal commissioner with General Rodil to bring back to obedience his native province of Extremadura, and acted with such success as to receive the grand cross of the Charles I of Spain, a high official station; but dissatisfied with the turn that affairs were taking, he resigned and retired to the army, and for some time occupied himself in combating the party which supported the revolution of La Granja. He founded the newspaper 'El Píldor,' in which he was assisted by Alcalá Galiano, and at the same time was the editor of the 'Revista de Madrid,' a review or rather magazine established on the plan of the French 'Revue des Deux Mondes,' his first article in which was one of a series on 'Spain since 1834.' He delivered in 1837 at the Athenaeum of Madrid, a series of lectures on the social structure of the Spanish nation which excited much attention. 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. He was at the war councils of Paris in the 'Revista de Madrid,' and have received high applause from Spanish critics. He returned to Spain in 1844 after the fall of Espartero, and was named plenipotentiary to invite Queen Christina back to Madrid, when his services were rewarded with the grand cross of Alcalá Galiano, which he never ceased to be active, was by this time active in an entirely different cause from that in which he had first won his laurels. From an ultra-liberal Donoso Cortés had become a Catholic conservative, and after Palmerston, the most distinguished literary advocate of Catholicism in 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 office that he died on the 3rd of May 1853, at Paris.

As to his writings, 'Colección Escogida de los Escritos del Excelentísimo Señor Don Juan Donoso Cortés,' was published in two volumes at Madrid in 1848. It comprises none of his poetry but most of his political writings that have been mentioned, and several of his articles from the reviews, which seem, like those of Macaulay, to be considered the brightest ornaments of his literary career. For brilliancy of style they are remarkable among the general flatness of Spanish composition, but for soundness of thought they are too rare to be chief ornaments of the literature of England. One of them, on Pius IX., talks of the "singular privilege which Italy enjoys in conjunction with Spain of drawing towards itself the attention of the civilized world," and goes on to affirm that "the nations always keep their eyes fixed by instinct on the Italian and the Spanish race."

There is much that is questionable on most of the subjects on which he touches.

DON. [AVROYD.] DOBBIN. [OXFORDSHIRE.] DORN. [SUTHERLAND.] DOUBLEDAY, EDWARD, a naturalist of eminence, was born in 1810, and died in London in 1849. The family of Doubleday are honourably distinguished for their devotion to natural science, and have occasionally distinguished himself by his contributions to the literature of Ornithology and Entomology. His first papers were devoted to the subject of entomology, of which many were published in the volumes of the 'Entomological Magazine.' The early part of his life he made a tour through the United States of America, and made many important observations on the animals of that country. These he published in a paper 'On the Natural History of America,' in the fifth volume of the 'Entomological Magazine.' On his return from America he was appointed one of the curators of the British Museum. The 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 are found 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 illustrations, of great beauty and skill, of species 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 labours. He devoted also a great amount of attention to the study of spiders, and published 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 section of the 'Bibliotheca Zoologica,' published by the Ray Society.

DOWNHAM. [NORFOLK.]
**Dracoina**, a sub-family of Saurians belonging to the family *Agamidae*, the tribe *Strobloeca*, and the sub-order *Pachylosauria* of Dr. J. B. Gray's arrangement. The family of Agamas, or Agamidae, is thus defined by Dr. Gray: "Teeth implanted on the end of the jaws. Tongue short, depress'd, apex entire or slightly nicked. Eyelids constrict, valvar. Feet, for walking. Toes all free, unequal; the thumb of the hind feet on the same plane as the other toes; the little toe lower down on the ankle than the thumb. The thumb is anterior and internal, and the great toe of the hind foot occupies the same position, the thigh and foot being bent forwards. This is proved by analogy; this toe being one that is clawless in the Crocodiles, which have the clawless thumb, and in *Anolis*, 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, exserted, supporting wing-like lateral expansions. Throat with 3 pouches.

1. *Draco.*—Ears naked. Nostril below the face-ridge.

2. *Dracocela.*—Nostril above the face-ridge.

3. *Dracocelum.*—Ears covered with scales.


* Toes 4 or 5. Ears exposed.


** Toes 5—6. Tail with elongated keeled scales beneath. Scales of back small, often with scattered larger ones.

* Ears hidden under the skin.


†† Ears exposed.


*** Toes 5—6. Tail with broad rhombic keeled scales beneath. Scales of back uniform.


**** Toes 5—6. Tail with truncated keeled scales beneath. Scales small, keeled, in cross rings.


The nape and back with a low crest. Tail rather compressed. Face-ridge rounded, with small scales.

16. *Charaxis.*—Parotis swollen, with some spines above. The nape and back with a low crest. Tail tapering. Face-ridge distinct, with enlarged imbricated scales.

17. *Gindalia.*—Parotis rather swollen, with 2 or 3 spines above. Nape and back not crested. Tail tapering, round. Face-ridge indistinct.

B. Femoral pores distinct.


18. *Lophora.*—Back and tail with a fin-like crest, supported by bony rays. Head squarish.


* Neck with a frill-like expansion on each side.

20. *Chlamydosaurus.*—Head rhombic.

** Ears simple.


25. *Grammatolophus.*—Back not crested, with cross rows of larger scales. Femoral pores numerous.


* Pre-anal and abdominal pores in several rows.


27. *Stellio.*—Tail with rings of large spine scales. Parotids spine.

** Pre-anal pores in a single line. Abdomen poreless.


* Ears exposed. Body and limbs with large spine tubercles.


34. *Uromastyx.*—Tail broad, depressed, with complete rings of spine scales.

35. *Saara.*—Tail broad, depressed, with scales of the upper part of the rings spine; of lower, armless.

36. *Latoilia.*—Tail round, elongate, tapering, with whorls of smooth scales.

The genera and species of the family *Dracoina* are as follows:

1. *Draco.*—Head small. Nostril in a scale, rather tubular on the side of the face-ridge. Tympanum of 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 crested. For skeleton of *Draco*, see *Dracon.*

D. *volans*. Linn., the Flying Lizard. It is the *D. major* of Lamark, *D. viridis* of Daud. *D. Bournonii* of Lacoon, and the *D. Daudini* of Duméril. 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 ovate keeled scales; the throat black-spotted; wings gray, fawn, or brown, spotted and marbled with black, sometimes forming four or five oblique black bands near the outer edge; the sides with a series of large keeled scales.

D. *Tenerum*, the Tiny Flying Lizard. It is the *D. viridis Tenerum* of Schlegel. It has flat scales, rather large, smooth, unequal, with a row of rather larger 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.

D. *sensilis*, 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

3 B
white, brown-spotted; lateral pouches of male elongate, angular, acute, 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 Dracaena farmiliaris, see D. Rana.

2. Dracocela.—Head small, covered with small unequal scales; the nostrils roundish, in a scale, erect, vertical on the face-ridge; tympanum exposed, and opaque.

* Nape crested.

D. dussumieri, Dussumier's Dragon, has moderate scales, rather rough; toes with a series of rather larger scales placed in roundish groups; orbit with a small bony point at back and front angle; wings with large brown spots near the body, and largely marbled near the outer edge; a black hand across the throat; base of the pouch blue-black; the limbs moderate.

* Nape not crested.

D. nectarotopogon, 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 large keeled scales; nape not crested; a large round black spot on each side of the base of the pouch; wings brown-spotted; the limbs elongate.

3. Dracunculus.—Head quadrangular, covered with small unequal scales; nostrils lateral, on the face-ridge; tympanum hid under the skin, covered with scales. Weigmann describes it as a small, but fine and well formed specimen in the British Museum, like the other dragons, have six on each side.

* Nape not crested, with a longitudinal fold.

D. guineofasciatus, 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 many equal granular scales.

* Nape crested. Ears slightly concave.

D. laticinctus, 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 rounded over, 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 depressed at the base, with the posterior ones slightly rounded.

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, or small; for smaller species of large keeled scales; ears rather sunk, with unequal flat scales; tail slender, with a central keel above and five more small ones on the sides; base dilated, with five nearly equal distant equal keels above.

D. splendidus, Weigmann's Flying-Lizard. Wings redish 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 form a series.

D. DRAGON.FLY. [LIPSCULLA, S.1]

DRAKE, a genus of plants belonging to the natural order Orchidaceae. D. elatiusa has a single flower placed at the end of a slender smooth erect scape from 12 to 18 inches long, and its labellum, which is hammer-headed and placed 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.

DREELITE. [CALLONITUS]

DROXFIELD. [DERBYSHIRE]

DROZ, FRANCIS-XAVIER-JOSEPH, was born at Beaancon on the 31st of October, 1773. Having visited Paris in 1792 he witnessed the massacre of September; after which he returned to Beaancon, 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 Sciences at the University of Lille in his native town; and in 1799 he published his 'Essai sur l'Art Oratoire.' In 1812 he published in Lille a work on the Theory of History, which was highly appreciated by his contemporaries. He died in 1844, after a long residence in Paris, where he settled definitively, and became connected with Voltaire, Cabanis, and all the leading literary men of the time. The advice of Cabanis, he published his 'Laws,' a work which was published in 1834, to attract attention to his philosophical writings. In 1836 appeared his 'Essai sur l'Art d'etre Heureux,' which was followed by an 'Etude de Magenta,' in 1811, for which a medal was awarded to him. From 1816 to 1820 he wrote for several newspapers, inculcating his opinion of the views of modern political writers, and criticising politics. He then joined Picard in writing his 'Memoire de Jacques Fauvel,' a tame imitation of Gi Blas; the work appeared in 1832. The next year he carried off the Montyon prize for his treatise 'De la Philosophie, ou sur les differents Systemes sur la Science de la Vie.' In 1825 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 Institute, on Moral and Political Science. In 1836 he published his best work, 'Histoire du Régne de Louis XVI.' His gentle and unambitious life came to a close on the 4th of November, 1850, when he died as peaceably as he had lived. Although his works are written in a very unpretending style, they are of theoretical importance, and were much valued by all the principal critics of his country have mentioned them with esteem.

DUCK-WEED. [Lemna.]

DUFFRENOYSITE. [Mineralogy, S.I.]

DUFFRENOY, a mineral, consisting of an arsenicite and sulphurised lead. It occurs in dodecahedrons of a dark steel-grey colour in the Dolomite of St. Gothard. The specific gravity is 5.

DUKE COLLEGE. Un under Astley, 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 sufficient for the stations and expenses of the college. An Act was therefore passed, 20 & 21 Vict. c. 84, 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, history and geography, 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. Under the Act there are twelve exhibitions of 100l. a year each provided for the scholars of the upper school, tenable for five years while studying at 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, wardens, fellows, and poor brothers and sisters are provided for; but for the future management nineteen governors are to be chosen; namely, two to be elected by the four persons who are elected to represent S. Savory, Southwark; St. Giles, Cambrewe; St. Lake, 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 the parish. They are to be an upper and a lower master of the schools, a resident chaplain, and an organist 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 maintenance and education of the scholars, and the fourth to the support of aged men and women, at present (1856) not to exceed twenty-four, and to be chosen in equal proportions from the four parishes above named.

Dulwich College. The reconstruction and preservation of the picture gallery. If a surplus should arise from this fund, it is to be applied in providing instructions in drawing and designing for such of the boys in the two schools as evince an inclination and capability for their acquisition.
DUM-CANE. [Caldium, S.]
DUMBLANE. [Pernishie.
DUNDAS. [Canada, S.]
DUNMANWAY. Cork, Ireland, a market-town and the seat of the Potou, of its beneficent siting on the river Bandon near its mouth, in 51° 43' N. lat., 7° 50' W. long., distant 33 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 245,625 acres.

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, a Roman Catholic 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.

DUNDEE. [Bannockburn.]
DUNSTER. [Somestonshire.]
DUPERRÉ, VICTOR GUY, a baron of the empire and a French admiral, was born at La Rochelle on the 20th of Febriary, 1775. He commenced his maritime career in the merchant navy at the age of 16, and entered the merchant service. He was later commissioned in the navy and served on a number of ships, including the frigate La Brise. In 1803, he was wounded in the Battle of Trafalgar.

After the revolution of July 1830, Dupont de l'Évre became a commissioner of the law in the provisional government in his own department, and soon after, yielding to the entreaties of Latife, he accepted the office of Minister of Justice; but his principles and want of flexibility were suited neither to his colleagues nor to the government. 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'Évre became, as much against his will, a member of the Provisional government. He died in 1855, at the age of eighty-eight, a firm but by no means a violent republican, he was generally respected as a consistent and honest politician.

DUTENS, JOSEPH-MICHEL, son of Michel-François, was born in the Loire, and at the age of seventeen entered under the École des Ponts et Chaussées, and at twenty-two years of age 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 Èvre. In 1804 he gave to the world his first work on political economy, an analytical exposition of its fundamental principles. In 1814, he was employed by the government to travel in England in order to obtain knowledge of 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 the Canal System of England." 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 conveyance of water to the country, and the third is devoted to a country where the energies of association are in almost all cases employed instead of the intervention of the government. "Desirous of enabling his country to profit by his studies in England, Dutens published in 1825, 'Notes sur le Navigation de France,' in which he gives a detailed description of the geographical features of France, and an account of its rivers and canals; with an analysis of the agricultural and industrial products of France, showing their values if made available by a net-work of canals, sketching a scheme 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 this Science.' In this treatise, Dutens sets forth his ideas 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 previous work, but otherwise it is a complete work in respect to commercial freedom and duties." The severe criticisms occasioned M. Dutens to publish in 1837 a defence 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 in 1843 and 1845, 'Essai comparatif sur la formation et la distribution du Revenu de la France en 1815 et 1835,' a work which contains the best statistical resumed of the productive riches of France, and has received and deserves high praise. In his last issued work, 'Des pretendues erreurs dans les comptes, un jugement des modernes économistes, seraient tombés les anciens économistes relativement au principe de la richesse nationale,' in which he defends the theory of Quesnay, saying, that the rich come from the poor, that a nation does not constitute the wealth of a country, but that this advantage is only due to agriculture. M. Dutens died in 1848. (Neuvelle Biographie Générale.)

DUTROCHET, RENE-JOACHIM-HENRI, a distinguished French botanist and natural philosopher. He was born at the Château de Néon, Poitou, on the 14th of November 1776, and died at Paris on the 4th of February 1847. He contributed to science the discovery of the emigrated, and whose property was confiscated. Young Dutrochet in 1796 entered as a private the military service, but afterwards deserted. In 1803 he commenced at Paris the study of medicine. He made a brilliant career as a student, was received at the College of France in 1815, and was presented to Joseph Bonaparte, king of Spain. He became principal physician to the Hospital of Burgos, which was then devastated by typhus. He displayed here great energy and
skill. In 1820 he returned to France, and gave himself up to the study of those natural sciences for which his medical education fitted him. The tendency of Dutochet'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 "exosmosis," and the passage from within outwards "endosmosis." 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'Endosmos et l'Exosmos, suivies de l'application expérimentale de ces actions physiques à la solution du problème de l'irritabilité végétale et à la détermination de la cause de l'ascension des lîges, de la descente des racines." The phenomena comprehended under the terms endosmos and exosmos were rightly described by Dutochet, 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 a variety of 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 Foetus; Researches on the Metamorphosis of the Alimentary Canal in Insects; on the Structure and Regeneration of Feathers; on the Height of the Meteor which projected Aerolites at Charbonville in 1810; on the Growth of the Introduction of Plants; and 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 "Mémoires pour servir à l'Histoire Anatomique et Physiologique des Végétaux et des Animaux."

DUVERNOY, GÉORGES-LOUIS, a distinguished anatomist and zoologist. He was born at Montpellier, then a dependency of the duky of Württemberg, 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, 1855. His father practised as a physician at Montpellier, and he was brought up to the same profession. He commenced his studies at Stuttgart in 1792, but the princely pittance of Montpellier having been ceded to the French in 1793, he was compelled to finish his studies at Strasburg. He subsequently went to Paris, where he graduated in 1801. In 1802 he was associated with M. C. Dumeril in reporting the lectures of Georges Cuvier, then in the zenith of his reputation. The "Lécons d'Anatomie comparée" were concluded and published in 1806. On the conclusion of this labours 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 1809 he was recalled to Paris, and named by De Fontanes joint professor of zoology in the faculty of science. Again, however, he returned to practise his profession in Montpellier, and for nearly twenty years this distinguished zoologist pursued his harassing and laborious duties. In 1837 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 unwearied 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 his emperor 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 Coleopterous Insects belonging to the section Pentacera, sub-section Lamellicornes, and family Dynastidae of M'Leay. The species have the body very large and thick, the outer edge of the jaws incised or toothed, and the lower jaws conoese 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 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 go out of the holes 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 colour. 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-tle is 6 inches.

DYSART. [Fifeshire.]

DYSCLASTE, a Mineral consisting of hydrous silicate of lime. It occurs in white fibrous masses, consisting of delicate fibres of a whitish or yellowish or bluish colour. It has a hardness of 4½, and a specific gravity of from 2·88 to 2·96. It is easily gelatinised in hydrochloric acid. It is found in the trap of the Faroe Islands. A variety called Oelinite is from Greenland.

DYSDEMA, a genus of Spiders. The species have 6 eyes, placed in a curve resembling a horse-shoe open in front; the mouth-claws very large, and produced in front; the maxille small, long, and dilated at the place of insertion of the palpi. The type of the genus is D. erythrina, which is an uncommon species in Great Britain. It is mostly found under stones.

DYSODIL. [Coal. S. 2.]

DYSLOUTE. [Mineralogy. S. 1.]
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 measures were taken and are now in operation. 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 Parliament (as well as the Crown) was necessary in some cases. 1 & 2 Vict. cc. 30, 106, 108; 2 & 3 Vict. cc. 99, 102 & 4 & 5 Vict. c. 39; 6 & 7 Vict. c. 77; 10 & 11 Vict. cc. 98, 103; 13 & 14 Vict. c. 41; 16 & 17 Vict. c. 50). 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 the Powers of the Office managing the establishment was regarded as a model for the excellence 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 engineer-in-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 administrative ability, and extortive powers of generalisation; 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'Académie des Sciences. Among the more important were some upon the composition of coal-gas, and its employment in metallic manufactures; and several upon the composition of rocks, the artificial reproduction of mine ashes, c., of which we may mention—Sur les Produits de la Décomposition des espèces minérales, la famille des Silicates, 1845; Sur une Nouvelle Méthode pour obtenir des Combinations Cristallisées par la voie sèche, et sur ses applications à la reproduction des espèces Minérales, 1847; Sur la Décomposition des Roches, 1848, and particularly Sur les Alterations des Roches stratifiées sous l'influence 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. Salvetat with the title of Recueil des Travaux Scientifiques de M. Ebelmen, 2 vols. 8vo, 1855. (M. Cheveux, Notice sur M. Ebelmen; Nouvelle Biographie Générale.)

ECCLESIASTICAL COURTS. 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 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 1850 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 such as appears necessary to them conducive to the efficiency of the Established Church; and further, to devise the best mode of providing for the cure of souls with special reference to the residence of the clergy on their respective benefices. These commissions met in 1851, recommending various alterations, and the appointment of permanent commissioners, for the purpose of preparing and laying before the sovereign in council

Eremurus, the Common Remora, or Suckling-Fish, is found in the Mediterranean Sea, and was known to the Greeks and Romans. Dr. Turton once took a specimen of this species feeding on cod-fish in Swansea Bay. The following is Mr. Yarrell's description of the sucker, subtracting the sucker from the fish:

"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 fin, which was rather equal. The margin is free, flexible, and of considerable breadth, to secure perfect contact with the surface to which it is opposed; the parallel
laminas are represented as only slightly elevated: the degree of adhesion is in proportion to the power used to raise the inner surfaces of the disc in a direction perpendicular to the plane of contact. \* \* \*

The vertical direction of the moveable laminæ is effected by sets of muscles going off obliquely right and left from two elongated bony processes, running along the sides of the moveable carapace, which are divided into two equal sections. 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, in each section, the moveable tracts, the divisions to which the muscles are attached, are nearer the middle line 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 laminæ, the outer edge of which is continuous with the corresponding projection of the carapace, are to be considered as nearly gonal at the base, acute. Stamens 10, shorter than the petals, and adnate to the base. Scales 5, short, obtuse. Carpels 5, ending each in a subulate style. The species are succulent shrubs, natives of Mexico. Nectar of the species is found in the arts or medicine, but their buds, young leaves, and showy flowers give them a place in every collection of plants. The genus is closely allied to \textit{Sisyrinchium}, and of many of the species resemble that genus.

\textit{Echinodorus madagascariensis} \textit{[Austrian; Steinheim]}, \textit{Echinodorus gracilis} \textit{[Stebnavian]}, \textit{Echinodorus martii} \textit{[Stebnavian]}, \textit{Echinodorus prolifera} \textit{[Stebnavian; Nitzsch]}.

\textit{Echinodorus pygmaeus} \textit{[Nitzsch; Head-Louis; Paschals, Sorteis, and Bouchard]}. These ecbasic parasitic habits seem to be partaken of by some of the Vertebrate animals, as we find the \textit{Remora} \textit{[Echinus, S. 2]} and other fish attaching themselves to the bodies of animals by an apparatus adapted for the purpose.

\textit{Land animals} are subject to the attacks of various forms of \textit{Ectocoa}, 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: \textit{Pulex irritans} \textit{[Nitzsch]}, \textit{Pulex tubercolosa} \textit{[Nitzsch]}, \textit{Pulex camptostoma} \textit{[Sowerby]}, \textit{Pulex camptostoma variegatum} \textit{[Buchheim]}. These \textit{Pulex} are peculiar species on almost every species of animal on which they are found, also with the species of the genera \textit{Pulex} and \textit{Oxina}.

\textit{Echidnus forsteri} \textit{[Nitzsch; Head-Louis; Pascals, Sorteis, and Bouchard]}. These ecbasic parasitic habits seem to be partaken of by some of the Vertebrate animals, as we find the \textit{Remora} \textit{[Echinus, S. 2]} and other fish attaching themselves to the bodies of animals by an apparatus adapted for the purpose.

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productions. The first was a series of "Essays on Practical Education," published in 1785; and "Early Lessons," which was continued by him and his daughter; the "Parent's Assistant" was also a joint production, as was the "Essay on Irish Bulls," published in 1803. But Miss Edgeworth's fame rests upon her novels, which were produced without assistance, and which gained for her the benefit of her father's revision while he was living. The series commenced with "Castle Rackrent," published in 1801, and closed in 1834 with "Helen." In the interval there appeared "Moral Tales," "The Prince," "The Model," "Popular Tales," "Tales of Fashionable Life," "Peregrine," "Fizlark," "Harrington," and "Ormond," with some minor tales. Her last production was "Orlando," a children's tale, published by the Murray, Chambers in 1847.

Miss Edgeworth's fame published some years ago in a collected series. The manner which they describe, especially those of fashionable life, belong in some degree to a past generation. But her 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 March 21, 1849, at the venerable age of 83.

EDG.

EDMONTON. [Middlesex.]

EEL. SAND. [Ammonites. N. 1.]

EEO. [REPRODUCTION, S.]

EICHORN, CARL FRIEDRICH, son of Johann Gottfried Eichhorn, obtained considerable celebrity as a able and learned jurist. He was born at Jena on the 29th of November 1751. After passing through the usual course of academic and legal studies, he was named in 1780 Privatdozent at Frankfurt, in 1781. In 1811 he removed to Berlin, and in 1817 to Göttingen, where he held each place holding the same chair as at Frankfurt. Ill-health however compelled him in 1826 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 made a member of the cabinet, 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 modifications. A fellow-labourer of Savigny, though taking a somewhat different branch 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. 8vo. Göttingen, 1806-18, which work has passed through eight editions; Grundriss des Kirchenrechts der Katholischen und Evangelischen Religionspartei in Deutschland, 2 vols. 8vo. Göttingen, 1815-16; and Einleitung in das Deutsche Privatrecht, mit Einschluss des Lehrenrechts. In conjunction with Savigny and Goschen he also carried on the Zeitschrift für geschichtliche Rechts-wissenschaft, Berlin, 1815-1848.

EIEF, wild high region in the Prussian Rhein-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 plain; the Ardennes hills, and the Moselle on the west; and the great flat plain of the Lower Rhine on the north. The name however, is extended to the sources of the Our and the Roer to the Rhine. At the head of these rivers lies an extensive highland called Pèrens, or Fragen (from the Celtic fanc' for bog)—a dreary waste covered with ferns, mooruses, and reeds, and rising between 1500 and 2000 feet high, with a length of about 16 miles every way, which connects the Eifel with the Ardennen, and offsets of which stretch nearly to the Meuse below Aix-la-Chapelle.

The Eifel is a rugged, desert, and in parts swampy table-land, which extends from 300 to 600 feet above the Rhine. Its slopes are scored in all directions by deep ravines 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 wild and picturesque appearance. On either side there and here rise up abruptly naked crags and basaltic cones of various elevations, some of them richly wooded, with wide-spread layers of ancient lava between. The general composition of the rocks is basalt, with gravel, schistose and slate, but the hills and rocks of sandstone, limestone, rhyolite, rjasins, and glens of the Eifel are in many instances composed of basalt or cappell with it; indeed the Eifel almost everywhere shows traces of violent convulsions and volcanic eruptions at various periods. The remains of volcanoes, cauldron-shaped depressions, tars of circular shape filling up ancient craters and locally called 'Maare,' mineral-springs, lava-streams, columnar basalt, fossil zoophytes and shells, proving 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, 3464 feet above the sea; Nürberg, which is also near Adenau, and is crowned with a castle; the castle of Rur, 2801 feet; Keilberg, near the source of the Eif, 2896 feet; Michaelisberg, near Münsiefer, 1680 feet; and the Schneisef, or Snow-Eifel, in the circle of Prüm, in the wildest part of the region, about the Oder, etc.

The Eifel has a length from east to west, between the Rhine and the Our, of about 60 miles. Along the left bank of the Rhine, north of Andernach, it extends for about 30 miles; but in the interior the breadth is in some places less than this. Rivers flow from it in all directions. On the northern slope lies the Minne-Eifel, a small town in the government of Cologne with about 1600 inhabitants, rises the Eiffel, which flows with rapid course down into the low country, and enters the Rhine at Grünlingen; a range of mountains called the Venn lies between these two streams, and below the Eifel the Roer receives on its right bank the Urt, which rises near Blankenheim, and passes Gemünd, a small town in the government of Aachen with about 1000 inhabitants, who manufacture woolen-stuffs, linen, and leather. Not far from the source of the Roer near the Wargrave, another past Malmedy, and throws itself into the Amblève, a feeder of the Ourthe, in the Belgian province of Liège. The Amblève itself rises a little south of the Warg, which it joins a little below Malmedy. Malmedy, a town in the government of Aachen, stands on the Warg, and has about 4000 inhabitants. It is a quaintly-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 tanneries. It also has many metal springs; many regions of woolen-cloth, lace, soap, potash, and glue. Montjoie stands in a marathy country between two high hills on the left bank of the Roer, and has a population of 3000, who manufacture woolen-stuffs, leather, and leather goods. A large, strong, and glosy castle above the town is said to have been erected as 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 Reil and forms below this town the border between the Prussian Prussia and the Dutch province of Limburg to its mouth in the Sure, a feeder of the Meuse. The Sure receives also from the Eiffel the Prüm, which rises in the Ourthe, and which is a branch of the Roer. Above its junction with the Sure the Prüm is joined by the Nette, which rises in the government of Tréves. It is situated to the south of the Schneisef 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 Pratam, founded here in the 8th century, and in which Pepin, natural son of
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1300 inhabitants, at the foot of the Hope-Acht. Ahrweiler, is a pretty walled town entered by four gates, and has about 2000 inhabitants, who are chiefly engaged in the growth of timber and in the manufacture of hosiery. There is a castle, and a collegiate church, near the town, and a Benedictine nunnery. The town has a market, and a fair on St. Michael's Day. Ahrweiler is a seat of the bishop of Mainz, and has a beautiful gothic church erected in the 13th century.

The Brohltal, a small feeder of the Rhine, enters that valley about 10 miles north of Mainz, and is a tributary of the Nette and the Ahr. The streams at Brohltal drives a paper-mill and several tress-mills, in which the volcanic tufa, quarried in the neighbourhood, is ground for exp-rt to Holland; the tufa, reduced to dust, is used by the Dutch for making sugar. The river is lined with trees and shrubs, and is a beautiful scene. In the tufa quarries in the valley of the Brohltal, land shells and trunks of trees r-dced to the condition of charcoal, are found imbedded. Mineral waters, resembling Seltzer, are got from springs in the valley of the Br-hl. A little north frequency hover over it. In all Prussia there is a field repaired by Professor Bethmann Hollweg, of Bonn. Sinzig is a small ill-built walled town of about 1800 inhabitants, with an interest in the Rhine church, erected in the beginning of the 13th century; an adjacent chapel contains a natural mummy, which was carried away to Paris when the French extended their frontier to the Rhine, but was restored at the peace. Sinzig occupies the site of the ancient Sentinunc, near which the cross with the inscription 'In hoc Signo Vinces' is found, and which shows the ancient people marching towards Italy against Massenius. The ancient Roman road along the left bank of the Rhine nearly co-inides with the present diligence road between Bonn and Coblenz. Remagen, a small place of 1400 inhabitants, occupies the site of *Rhojugamum*. Roman antiquities have been found here.

About 6 miles inland from the mouth of the Brohltal, is the large and beautiful crater-lake of Laach, or Laacher-See, which is 666 feet above the Rhine, of elliptical shape, 2 miles long and about a mile and a half broad; its depth 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 occur from a subterranean eruption of volcanic gas, which issues 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 Avernus in Italy, that no bird can fly over the Laacher-See. 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 freeze; and abound in fish. The chief natural outlet of the lake is a stream which is carried off by an underground emissary nearly a mile long, cut in the 13th century by the Benedictine monks of the newly ruined abbey of Laach, which is a little south-west of the lake. The shores of the lake are covered with orchards and vineyards, pumice, and other useful products. Laach abbey, or Kloster-Laach 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-house; 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 its preservation by the Prussian government. The gardens of the abbey, the lake, and village of Laach, are favourite places of resort with the inhabitants of Coblenz. Between the lake and the Nette are the famous millstone quarries of Nieder-Mendig which have been worked in the hard porous lava for 2000 years. The lava stream in which these quarries lie is 6 miles long and 3 miles broad. The lava separates into gigantic columns, some of which are left by the quarrymen to sup- port the roof; there are vast caverns in it, probably the result of ancient excavations. At Mayen, a picturesque old town, on the Nette, with about 3000 inhabitants, rises by a castle and small walled mills and gardens. There are several millstone quarries, a paper-mill, tax-yards, and mineral springs. To the geologist, the botanist, and lover of the picturesque, all the southern and eastern part of the Eifel is a region of the most astonishing beauty. Besides the Laacher-See, there is a lake of less than 27 meare, marking as many 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 and dampness appear to render it so district as to poor in arable land as the Eifel. The rugged surface of
The region is covered with wild heath or swampy bog, the thin 
esting 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 dis-
trics covered with volcanic deposits. The chief species of 
tree timber are beech, oak, and chestnut, and show a great 
quantity of fuel and timber. The valleys and glens are all 
inhabited, and in these the population is gathered into small 
towns, villages, and hamlets, most of which have sprung up 
under the adorning protection of some feudal castle, and a 
few of which are surrounded by ancient monasteries round 
on the rapid slopes along the Ahr valley and towards the Rhine, 
where fruit and tree yielding valuable crops; here every piece 
cultivated land is covered with walnut, apple, pear, or 
cherry trees. The wine of the Artabl is of excellent quality. 

The region of the Eifel is exposed to a phenomenon called 
Weinbruch, or Cloud-Burst, being a sudden discharge of 
water from the upper reaches, which in the season of great 
May strike; trees are rooted up and hurled down by suddenly 
formed torrent; cattle, houses, soil, and crops are swept 
away. A cloud-burst of this description destroyed the greater 
part of the valley of the Eifel.

The principal roads through the region of the Eifel are 
those from Aix-la-Chapelle to Treves, and from Coblenz to 
Bonn; the high road up the left bank of the Moselle from 
Coblenz to Treves, and the new road up the Artabl to 
Treves. The construction of the last mentioned place had 
been bad. The great Roman road made by Agrippa from 
Treves to Cologne traversed the western part of the Eifel. 
Along it were numerous post houses (poststationes) and six 
mansions, serving as military posts and hospitals. 

Vicus, now Bitburg, was one of these mansteins. Zeilrich 
(population 1900), near the Nassau, a feeder of the Erft in 
the plain, at the northern base of the Eifel, was another of 
the mansions, and was called Tolbiacum. The road is still 
in a perfect state at Zelrich. Remains of an aqueduct which 
ran parallel to the road, and along its whole length, to supply 
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 
port of Sankt Goar, is a civil work (reconstructed 281) in 
which every thing that is good has been ill, and is crowned 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 Rolandseck is the 
circular crater of Bodenberg, which is a quarter of a mile 
across and 100 feet deep; its sides, which are composed of 
tufa and scori, are cultivated. The castle of Godage, 
a town of about 1000 inhabitants, a short distance north of 
Rolandseck, is an interesting object on the road and from 
the Rhine. Between Godage and Bonn, at the north-eastern 
extremity of the Eifel, are the coal and alum mines of 
Friedorf. The coal is of the kind called lignite or fossil 
wood, and has evidently resulted from the subsequence of some 
primal forest; fossil fishes, fresh-water shells, and very 
flakes of bone, have been found in this region. The inhabitants 
are, however, not very numerous, and are very poor; their dress rather 
slowly than neat, and their houses are in general rudebly 
constructed. Iron and lead mines are worked near Gemund. 
The manufactures are unimportant, with the exception of leather 
manufatures, which are somewhat improved. The region of 
the Eifel is a said to be an old German name for the Ardenn, on 
which region the Eifel is in reality a part.

EJECTMENT. The action of ejectment (Ejector) in 
which the plaintiff is the present or former tenant, and the 
plaintiff is in action of ejectment, and is not alone the 
nominal plaintiff. The name Richard Roe the nominal defendant has been abolished, and 
new and simpler mode of proceeding substituted for it.

John Doe's suit was attended with one great disadvantage: 
it could only be followed out during term, so that, if a right 
to lands in Yorkshire accrued on the 1st of June, the person 
entitled would be unable to bring his adversary into court before 
the following November, or in case of a defence, to proceed 
before March in the following year. The fictions on which 
the old mode of proceeding was founded were 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 
land was created, which has not only the one distin- 
guishing 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 per-
sons entitled to possession by the persons so named, and to 
all persons claiming by or through such persons; and commands 
the persons to whom it is directed to appear within sixteen days to 
defend the possession of the property claimed; a notice being added, that, in default of ap-
pearance, they will be turned out of possession. This writ is 
served on the tenant in possession, or, in case of a vacant pos-
session, by posting a copy thereof upon the door of the dwell-
ing-house, or other conspicuous part of the property. Every 
tenant served with a writ must give immediate notice thereof 
and appear and demur, or, if unable to appear, to surrender 
the 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 
in interest in the premises beyond the temporary possession. 
A trial on demurrer, or at the next convenient time, is fixed to 
defend the possession; for possession has now become the 
very essence of property, twenty years' uninterrupted pos-
session constituting a title good against all the world.

If no appearance is made to the writ, a judgment to 
recover possession of the land claimed; to which he by 
the writ asserts his right. By entering an appearance, the 
tenant, or the landlord, or any other person admitted to de-
defend, denies that right. The parties are then at issue on 
the title to the land, and the next thing is for the tenant 
claimant to prove his alleged right to a jury 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 writings of assize, being calculated to try the mere posses-
sory title to an estate; and has succeeded to those real 
actions, as being infinitely more convenient for attaining 
the end of justice. It has on the same principle been rendered 
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 
Act (11 & 12 Vict. c. 26) empowers a landlord to bring a 
right of re-entry in case of non-payment of rent, when 
half a year's rent is due and not sufficient distress is to be 
had, to serve a writ of ejectment on his tenant, or fix 
the same upon some notorious part of the premises, which 
shall be valid, without any formal re-entry or previous deman-
dent. And a recovery in such ejectment is final and conclu-
sive, both in law and equity, unless the rent and all costs 
be paid or tendered within six calendar months afterwards.

The same statute (re-enacted 1839 and 1849 IV. c. 87), enables 
the landlord, on serving a writ of ejectment on 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 
to do so by the court or a judge), conditioned to pay the costs 
and damages, if the claimant be able to recover in the suit. 
A judgment for recovery in this case is a nullity, and is 
not open to appeal, for the premises do not exceed 50L, and no fine 
have been paid, proceed in the County Court (19 & 20 Vict. 
c. 108, ss. 80-86). And if the rent does not exceed 20L., 
and no fine has been paid, he may proceed summarily before the 
justices in its own county (Johnson, 327; Blackstone's 
EKEBERGITE. [Mineralogy, S.1.]
ELEOLITHE. [Mineralogy, S.1.]
ELAIDIC ACID. [Chemistry, S.2.]
ELADEHYDE. [Chemistry, S.2.]
ELLISTA. [Geology, S.2.]
ELAPHUS. [Zool.]
ELASTIC TISSUE. 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 appearance, and it has been called Yellowness Fibre. 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 the regular tissue, either in the fibres of networks of various kinds. The 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 tissues hard, dry vessels and nerves, exists, so to speak, in a pure form. Of these we have examples in the ligamentum subflava of the vertebræ, the ligamentum nuchae, the ligament of the larynx, and the subligamentous ligament.

2. The elastic membranes 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.

(Manual of Histology, translated by Busk and Huxley for the Sydenham Society.)

ELECTION. The proceedings on the election of knights and burgesses to the Commons House of Parliament have four principal periods: the nomination, the return of the candidates, the poll, and the counting. The whole, as already stated, is of a very minute and complicated nature, and is often more or less, directed to obtaining what is called 'purity of 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 merely 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 oaths, through whom the voter can account in court; and the election is conducted 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 unseating 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 expenses, to the election auditor; who, when the election is over, pays and publishes the expenses 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 in a state of transition. The election is a matter of temporary operation and of an experimental character. (Blackstone's Commentaries, Mr. Kerr's edition, vol. 1, p. 168.)

ELECTRIC TELEGRAPHIES. In the previous Supplement a full account of the discovery and of the application of the electric telegraph was given. [Telegraph, Electric.] All that remains now is to complete the account by a statement of its more important improvements, and more especially of the extended transmission of messages by submarine telegraphies, 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 Palermo in the south, 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 new laid down; insomuch that the languages of the two countries, though separated by the length of the line. The exceptions to this rule are so few as scarcely 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 transmitted 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 ports, and to nearly every inland town of any commercial pretensions. 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, the forwarded, to the great advantage of 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 the like. In the course of the year 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 births, deaths, and marriages, inquiries after lost luggage—are only some of the thousand open or conditional 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 mail-coach road from London to Dover, a subterranean arrangement has been adopted: the wires being enclosed in a wooden trough, and deposited a foot or two beneath the surface of the ground. This arrangement is also adopted in the streets of London, and of other large towns.

An interesting use of the sub-way telegraphy may be here noticed. In proportion as the use of Greenwich time has become familiar on all the English railways, so has it become important to fix in this time some means by which we may make the system of the railway offices to enable all the station-clocks to be regulated thereby. This is one purpose of the new time-ball in the Strand. The Electric Telegraph Company, the South-Eastern Railway Company, and the Greenwich Observatory, have entered into a contract in the establishment of this plan. A subterranean wire has been carried from the Observatory, through Greenwich Park, and across Blackheath to the Lewisham station of the North Kent Railway; thence to the London Bridge station; and thence to the Strand office. The system is such that at 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 past one 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, exactly to a single second, the great or master-clock at Greenwich Observatory puts in action a small metal mechanism which sends an electric shock 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 arranged that it drives a pointer which runs up and down a scale of 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 water-gauges can do so. This system is such that the electric current should fire off a gun at the same time and place, so that the sound might be heard if the descent of the ball could not be seen.

In the English telegraphs, the wires employed are usually of 1/30 inch diameter, covered by a special coating of zinc, to prevent oxidation. Four miles of such wire weigh about a ton. The supporting posts are about sixty yards apart, with connecting wires of copper, insulated with paper, so that the wire may not touch the wood itself; the connecting pieces themselves being sheltered from rain by a small overhanging roof. At intervals of a quarter of a mile are winding posts, with
apparatus for screwing 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 wrings a greater spring in the lines, and in this way he delineates, by means of certain indices, the relative positions of which indicate letters and words. The action of the machines was sufficiently described in our former article. [TELEGRAPHS, ELECTRIC.] Improvements have been since introduced, but the principle is in its general features the same as that which has been made by the Electric Company. Many patented inventions and machines, to be used subsidiary to the needle-telegraph.

Such as there has been of legislation in England concerning electric telegraphs and their patentees, 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 Morice. In 1855, it is chiefly the owners of Mr. Morse's patent rights by whom the legal contest is carried on. In one trial in 1861 the evidence extended over a thousand printed pages; and in several other trials it extended to many hundred pages—containing the opinions of more than one hundred witnesses. Between 1837 and 1849, Professor Morse took out seven patents, under the powers of which many thousand miles of telegraphic wire have been laid down.

Bain and Morse both employ a method which, for familiar illustration, may be characterized as nearly the same; and we will therefore briefly describe Bain's. Let us suppose a message to be sent one hundred miles, from one station to another. The letters of the message are separately transmitted, by means of a key-board or a set of handles; or at least a series of conductors, which are all connected together. At the other end of the wire, a small needle or metallic point has slight reciprocating movements given to it by the impulses; and it presses upon a strip of chemically-prepared paper which slowly moves onward by means of clock-work. At the instant of contact, the paper becomes discoloured by a chemical action between it and the iron; these discolourations appear in the forms of dots and short lines, certain combinations of which are understood to represent the letters of the alphabet. The whole system is thus made up into a message is thus preserved—in a cypher which requires to be translated into English for the use of all except the telegraph officers.

There are many patented systems in England, Germany, and America, exhibiting analogies to those of Bain and Morse. Mr. Rogers, of Baltimore, substitutes a pen for a needle or point, a brass die for a paper strip, and a kind of ink for the chemical preparation in the paper. The pen is dipped in the ink, which imparts a mark to the page. At the other end of the wire, a metallic point has slight reciprocating movements given to it by the impulses; and it presses upon a strip of chemically-prepared paper which slowly moves onward by means of clock-work. At the instant of contact, the paper becomes discoloured by a chemical action between it and the iron; these discolourations appear in the forms of dots and short lines, certain combinations of which are understood to represent the letters of the alphabet. The whole system is thus made up into a message is thus preserved—in a cypher which requires to be translated into English for the use of all except the telegraph officers.

Mr. Bakewell and other inventors in England have put in practice printing telegraphs, in which the letters of the alphabet are stamped upon the paper, instead of being written in ink. These machines are described in a paper read by Mr. House, which is now before the house.

This wire, in four hours, the telegraph is capable of transmitting more words in a minute than either of the other two principal American systems; but to balance it a great deal of time is consumed in adjusting the instrument. There is a fallacy in some of the statements respecting the rapidity of these systems; the swiftness with which messages may be transmitted has been greatly exaggerated. Mr. Bain's 'fast method' enables one thousand letters to be transmitted per minute; but the process of preparing the message requires about as much time as the transmission by the ordinary method. It is said, that in the ordinary every-day working, the American rate of transmission averages from seventy-five to a hundred letters per minute. On one particular day, in the spring of 1845, Bain's line transmitted 800 messages, besides 6000 words of foreign news, from Boston to New York.

Remarkable and valuable as is the degree of rapidity already attained, there are many reasons to wish for still greater facilities in the subject. Some of the principal improvements have been made by various inventors, some of them, in reality, are improvements of the earliest patents, and have been made by the Electric Company. 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 method.

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 cables (26 miles) dipping between the Scottish and the Irish Shores. In 1858, a line to Ireland was laid; and in 1861 there was opened a line from Portpatrick to Stranraer and the centre of Scotland; the other through Stranraer to Dumfries and the net-work of British lines. At the other end the cable is connected with the line of the Irish railway through the Irish lines. Without any difficulty a message is sent from London to Ireland via Dumfries without regard to circuitousness of route; for the electric current reckles little of distance. Next comes the line to Dublin, the cable (64 miles), joined at one end to the Welsh and English lines, and the other end to the Irish lines. In the south 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 with a land-wire running through Lymington to the Brockenhurst station, and at the other end with a land-wire passing through Yarmouth to Osborne. Further east is the Dover and Calais cable (22 miles), connected at the two ends with the submarine system of the Baltic; and relatively connected with the European wires. All these cables are thicker than that intended for the Atlantic, presently to be described; and all have had occasional mishaps; but taking them collectively, they afford a remarkably curious apparatus, which may be exchanged between Great Britain and all the neighbouring countries. The salt-water, the storm-tossed ocean, have been pretty nearly conquered by the ingenious men engaged in these operations; and now the English public hear with little surprise of messages telegrams (to use a new word concerning which Greek scholars have been carrying on a fierce battle) brought under water as if brought on dry land.

Directing attention next to the continent of Europe, we find telegraphic wires ramifying in all directions. Nations were never more struck with the wonders of the electric telegraph than on the occasion of the death of the Czar Nicolas in 1855. On the 2nd of March the Rial of Clar- rendon announced in the House of Lords that the Czar died at St. Petersburg at one o'clock on that same day. Two distinct messages had been received, one wid Berlin and the Hague, the other wid Berlin and Ostend, both communicating a message telegraphed to Berlin from St. Petersburg, and sent by land and sea over the actual electric cables of the Russian post. The northern 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. Cir-
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 telegraph, is in areas of Austria and Spain is lower on the list than 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 Constantinople, by which news from the seaport could now be flashed 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 Karsisch in the Crimea, there to be available to the Russian engineers engaged in the subsequent siege of Sebastopol: it was one of the many contributions of peaceful industry to dread war. The Czar Alexander and the Sultan Abdü-l-Medjid, now that hostilities have ceased between them, wish, if so disposed, by specially telegraph, 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.

Naumov 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 continental dominions: land-wires on the islands themselves, and submarine cables from Corsica to Genoa and Sardinia to France. This being done, the grand question arose—how 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 some point in the palaic 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 places. A line of 750 miles, laid down by the Sardinian government, 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 enterprise was commenced 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, was completed last year; and the part of the Austrian government to extend their land-telegraph from Trieste to Ragusa, to lay down a submarine cable from Ragusa to Corfu, there to join the line just described, was also in contemplation, with a view to stopping at no intermediate island. The Mediterranean cables, actual or proposed, may thus be classified in four groups: from Spezia in the Genoese State to Cagliari in Sardinia, promoted and supported by the Sardinian government, from Cagliari to the African, by the British government; from Cagliari to Malta and Corfu, by the English government; and from Trieste to Corfu and Alexandria, by the Austrian government.

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 termine of electro-communication on the north coast of Africa, another at Corfu, and a third at Constantinople; and the question then arises—how best to apply the system to 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, to be laid down at Aden, whereby a land wire or a submarine cable to India; while the other starts from Syria or from Asia Minor, and follows the valley of the Euphrates through Mesopotamia to the Persian Gulf and the Indian Ocean. The history of the latter is prolonged, whenever convenient, to India. The promoters of the Red Sea cable estimate its merits somewhat in the following way. There would be a land line of 450 miles from Alexandria to Suez; and then a submerged cable of 4800 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 Cossir, Juddah, and Camaran; while there would be three others between Aden and Kurrachee, at Ras Shurmah, the Kooria Mooria Islands (now a British possession) and Ras el Had, in the Imman 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 want of money, they could lay down a submarine cable of 6000 miles, at a cost of 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 firman from the Turkish and Egyptian Governments; that a cable from Alexandria to Kurrachee is freed from the duties of ministerial politics; 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 Red Sea Telegraph Company would undertake 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-westward 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 2800 miles in all. The estimated cost is 400,000l., and the time of completion six or eight months.

Having thus noticed the various projects for establishing electric communication between Europe and India, we come to a few words concerning 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 the year he constructed and 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 sent a telegram from Madras to Sh.WriteByte(187,187,187)ar, stating that he had established the whole trunk line from Calcutta through Agra, Delhi, and Lahore, to Attock 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 1855,3800 miles of trunk line were extended from Sh鲃ar 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. The whole system was completed in 1856, and, although interrupted by war, other lines were executed, raising the length to above 5000 miles. Throughout Central India the engineer was opposed by enormous difficulties; there was no metalled 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 Toonbuddra crossing was two miles wide, and that of the Soone more than three miles.

The telegraphs of the East India Company begin at Madras; the telegraph there 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 332 miles it is supported on superb granite slabs, each 16 feet high. The whole expense has, nevertheless, been kept within 50l. per mile.

Viewing the state of telegraphy on the other side of the Atlantic, we come to that which almost baffles calculation. The telegraph system is the same 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 man could use them for the purpose of conveying intelligence 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. cheapness of telegraph lead
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. A paper has enabled us to operate 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 constructing an Atlantic Telegraph, the Governments of Great Britain and the United States agreed not only to pay each to the Company a subsidy of 10,000 l. 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 gentlemen who had practical experience in the work of marine telegraphy, Mr. Canning, who submerged 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 engineering appliances for the submersion of the cable, 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 by the legislation of 1851 could little further assist in the submersion of 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. Never had more extraordinary preparations leading to the undertaking were entered upon. It was deemed very important 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 insulating gutta percha mass; the wires being so joined at their extremities upon the occasion of the experiments as to form continuous conducting circuits, the whole being operated at Greenwich with an extent of 1146 miles. In the following year, with the co-operation of the Magnetic Telegraph Company, arrangements were made for the crowning trial in the per- sons of Mr. Whitehouse and a Mr. C. Baddeley. The results were so satisfactory, that a permanent connection, and the time. The wires of this company extended under ground, and through the sea, from London through Dumfries to Dublin, along a course of 690 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 formed. Upon a pre-determined night, that of the 9th of October, ten gutta percha-covered insulated wires, each more than 200 miles long, were connected into a continuous circuit of more than 1000 miles. The conductor wires were fastened to the building at the offices of the company in Old Broad Street, London. 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 at the rate of 310,241, 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 is possible, Mr. Whitehouse's late experiments for though the greater part of the cable employed in this experiment was subterranean rather than subaqueous, it is now well known to the initiates in these matters, that the two cases are, as nearly as possible, identical in all their essential characteristics and properties. During the preparation for the construction of the Atlantic cables, 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 contributing notable pages to the pages of the history of electrical science. Foremost among the labours of the experimentalist, however, necessarily stood the completion of his instrumental means of research. He very soon found that the apparatus which had been previously in use as measures of electrical force and current would entirely fail to answer the examinations he had undertaken upon. He consequently set himself to work seriously to remedy the defect. The usual method whereby the force of an electrical current had been employed was to suspend a freely suspended magnetic needle near to, or within, a many-spirited 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 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 which the Atlantic telegraphy 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 of equilibrium. This drawback led Mr. Whitehouse to dispense altogether in his investigations with the triffling and unstable needle, and to call in 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 substitute as much as possible of the same for the 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 a combined measurement and registration of the electromotive action, Mr. Whitehouse named, when he had perfected the mechanical details of its construction, his Magneto-Electrometer. Mr. Whitehouse's instrument for measuring the force of electrical currents consists of a delicate steel-yard 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 wire carrying a current of 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 coil, and the weight of the steel-yard; and consequently a greater or less weight can be tilted up on 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 by varying the distance of the current from the artificially magnetised bar, so wide a range of mechanical adjustment is commanded that degrees of attraction can be accurately estimated from these 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. The instrument consists of a pendulum, beating true seconds, connected with 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 voltaic 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 plate, which is itself set free from the battery. The crest of the pendulum lifts the spring, which it touches for the time, from the pillar. When it lifts the right spring it sends an electrical current out through it and any conducting wire placed in communication, and back through the left spring, which is connected to the pillar of the battery. 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 these 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 direction of the currents. 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 magnet, which is arranged to strike the linear style pressed down on the ribbon of paper, so that a visible trace is left upon its surface. When the magnets lie in another direction, they turn the currents of the local batteries off, and cause the pen to cease to print. Therefore it is the pendulum which reverses the direction of the primary current in the long wire, and so the positions of the temporary magnets, a trace is printed on the temporary ribbon of paper, each alternate second, as the ribbon is drawn along, and an intermediate interval is left. But there are two batteries printing, one at each extremity of the wire, if any appreciable time be occupied by the passage of the current along its extent, and if the two batteries are made to record, side by side, upon the same ribbon, the distance between the two respective points in the second-long trace will be an 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 within the extreme limits of an accuracy of 1 1000 of a second, and so 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 styles, because the estimate is always a relative between what each instant to a particular length to a particular pace, is made by the beat of the pendulum. When the velocity of transmission in any special wire is to be examined, the apparatus is set to work, and a somewhat lengthened series of observations is printed off. This is then narrowly scrutinised, with a view to the length of the heavenly days, and the mean of all the more trustworthy ones is 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 course with inferior speed to its weaker companion. It is in order, however, to state in this connection the heaviest agent proved to be by no means the most fleet and agile one. Seventy-two pairs of sixteen-inch sand-battery plates lifted 1400 grains on the steel yard of the magneto-electrometer at the end of 600 miles wire, but the current of the voltaic wire only raised 14 grains, in the same space, as the distance. Two large electro-magnetic induction coils, excited by a Smee's battery of ten pairs of one hundred square-inch plates, sent forth a current which lifted 745 grains at the end of the same wire, but which arrived at that in one hundred sixteenth of a second. Simple voltaic electricity is capable of greater mechanical effort, under any given arrangement of conductors, than an induced electro-magnetic current, but the electro-magnetic current travels through lengthened conductors with a considerably superior rate of speed. The electro-magnetic current sent forth from induction-coils possesses a treble velocity of transmission, and resists 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 or distance.

In the 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 submarine cable was operated upon, with telegraph-wires coated with gutta-percha and running beneath an ocean 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 experimenters, 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 1854, the statement was made that the velocity of electric currents in underwater cables varied from 1000 miles per second to 10 miles per second, but in submarine line 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 that the slowest current was that in a 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 average speed of a current of electricity in 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 particular circumstances to 1800 miles per second, and that of that the induced current might be augmented to 6000 miles per second.

But what could be the cause of these varying rates of velocities, and of the phenomena in general which the electrical influence was thus proved to suffer when it was constrained to traverse coated underground or sub-marine wires, instead of air-surrounded conductors? Professor Faraday had thoroughly investigated this question so soon as the unexplained phenomena in submarine telegraphs made their appearance, and he had cited the seeming anomaly. When a conducting wire of metal is stretched as an electrical conductor between posts, and is insulated simply by earthenware holders and the circumambient air, the electrical influence runs along it as a simple stream, without any loss of strength from an unevenness of resistance; 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 property is given to them, which makes them conductors of the most stable substance, 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 excited one present upon the external surface of the insulating 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 charged or rather charged with a certain quantity of static electricity whenever a new wire passes through it. 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 the submarine telegraph cable is spaced with a 600 miles wire, it is necessary to fill up the 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 propagated along its substance. The wire on encountering an occasion, must be filled to saturation 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 his delicate instruments to procure a very beautiful illustrative proof that it is such Leyden jars, 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, external coats of wax, gutta-percha, and tinfoil, that could be 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 fill each of these bottles with an electric charge from the conductor, and discharge 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 inductively retained in the wires, by the
In some of Mr. Whitehouse’s early experiments it was found that the induced electro-magnetic current took a second and a half, when transmitted through a coated wire 1146 miles long, in consequence of the retarding influence of induction in this lengthened channel. This apparently is a very excellent result—a signal conveyed eleven hundred miles in less than two seconds! It is not enough, however, for the exigency of the case, for on the spelling out messages, the most letters require three or four signals 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 their telegraph efficiently. The experimenter, therefore, set himself to see whether he could not find some means of quickening the pace of his too lagging messenger. He ultimately accomplished his object by means of a combination with electro-magnetic coils which enabled the operator, through the simple reversal of the current of the magnet to send currents of different kinds of electricity, one after the other through the conducting wire. Each successive transmission then served to clear away the lagging current of the antagonistic current which immediately preceded 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 positive, in exact alternation, the current in the line 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 accordingly proceeded to test the deduction in twofour ways next, by exempting the iron core of the magnet from the power to produce mechanical effects in consequence of its having made certain extended journeys; and then by closely scrutinising its loss of speed at varying distances. The current from a voltaic battery which was inserted by means of an iron core, was transmitted to the magneto-electrometer through wires of different lengths. Where the wire was only a few feet long, 25,000 grains were lifted on the steelyard. With a wire 300 miles long 10,650 grains were lifted. With 400 miles, 3250 grains, and 500 miles, the wire transmitted no electricity at all. 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 249 miles in thirty-six-hundredths of a second. With 498 miles in seventy-nine-hundredths of a second, and with 1020 miles in a trifle less than a second and a half. Taking 63 miles as the unit in these respects, he found that the number of miles that the current could travel in one second, was 1, 2, 3, 6, 12. Therefore, if the so-called law of the squares of the distances were correct, the transmission through the 1020 miles of wire ought to have required 144 times as long as the transmission through the 83 miles. In practice, however, the number of miles employed in the distances represented by the series 1, 2, and 3, the rates of velocity were represented by the fractional series \( \frac{1}{4}, \frac{1}{2}, \frac{1}{4} \). It therefore appears, from experiments, that nature is more auspicious to the cause of wide ocean telegraphy, than the assumption of theory.

During the experimental investigation 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 of battery would prove sufficient to effect a charge and transmit a current, through some thousand miles of the Atlantic cable, Mr. Whitehouse had a piece of apparatus prepared consisting of twenty-five pairs of zinc and silver plates, each about the twentieth of a square inch large, and the pairs so arranged that the zinc plate above became the positive pole and the silver plate below the negative pole. They were separated by distilled water or brine between them. On charging this littlepitan 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 without a perceptible diminution of the electrical effect until at last only a single pair, charged by one small drop of liquid was used. Strange to say, with this single pair, and single drop, distinct signals were effected through an uninterrupted series of messages, which were perfectly registered at the end of the cable, in a trifle less than three 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.
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 coils, alternately. It was also observed that the diminution of the speed of motion along induction-embarrassed 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. It was also observed that 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 the smaller ones are better suited for long lines employed in the great 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 conductor. Both the difficulties met with at first, and the consideration 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 sea, led to the conclusion that it could be done by a wire, the coating of which might be exposed during deposition. 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 wires without friction. It was for these reasons that the inertia and rigidity to allow of its lying in a tolerably straight line when once in situ at the bottom of the sea.

The plan which is, in accordance with the indications of the above-mentioned experiments, &c., was adopted in preparing a cable for the Atlantic. A strand of 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 size, 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 accident which could lead to an interruption of the current, could interfere to any important extent with its 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 upon the insulated power of the communication was tested. It proved that the transmitting capacity of the cable was only diminished by one thirty-seventh part.

When 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. Thus 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 rasped into shreds, and washed through many times of fine water, and kneaded for hours in the interior of iron cylinders by steam machinery. It was then squeezed by powerful 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. Two or more successive 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 test of 200 pounds to the square inch, by the use of hydraulic power, without the insulated material being at all injured by the force applied.

During the process of manufacture of this core it was submitted to constant examination to prove both that the core was perfect and that the coating was not injured. It was also observed that the insulating power of the gutta percha sheath 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 causing it to record a signal after issuing from 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 which a smaller current would not be 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, to each extreme of the core, the other pole with 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 considerable charge of electricity, which could not escape, and so 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 imperfections to the earth, and so got 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 equilibrium, the deflection being in proportion to the amount of the current. A voltaic battery of five hundred pairs of plates was employed in detecting imperfect insulation, in preference to a weak one, because a strong current would force a passage through an imperfection which might be too slight to allow a weak current to pass.

A second idea was also adopted, which was to institute a plan devised which enabled the testing for both continuity of the strand and insulation of the sheath to be carried on simultaneously. A voltaic current can pass through a charged Leyden jar without either the current or the charge being destroyed, if the length of cable under examination was joined up into a loop or endless ring, and a voltaic battery of five hundred pairs of plates had one of its poles connected with the conducting strand of this ring, and the other pole with the earth; and then a current of 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 so placed in the circuit, that the usual way of connecting the bell needle, before held magnetically fast, and caused the bell to 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 rung its bell whenever the circuit was broken. The strong battery out of the circuit rung its bell whenever an outflowing current was set up through the strand, in consequence of the insulating sheath being broken.

During the prosecution of these 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 power, and a considerable temperature restores it to its original excellence. An opportunity was taken, when a single flake or tier of the completed cable was lying at the bottom of the receptacle in the yard of the manufactary at Greenwich, to watch the changes which the natural variation of temperature during forty-eight hours produced in its conducting capability. When the thermometer stood at 45°, the deflection of the galvanometer needle was barely 3°; but when the thermometer rose to 59°, the deflection had reached 14°. The next day, with sunshine and cloud made the tell-tale needle traverse out and in with surprising rapidity. There is fortunately reason to conclude that the bottom of the Atlantic will supply the low temperature essential to the good performance of the insulating material. The last sentence might be a statement of Dayman of the Cyclops, have enabled him to determine the deep-sea temperature over a very considerable range, and are abundantly confirmatory of this fact.

The core was put upon a spool as many miles' length of many of these cores were joined into longer extents in a very ingenious way. The gutta percha was scraped from the ends for a short distance, and these were placed in contact. A piece of copper wire was then attached by firm brazing to one side of the joint, and another of the same wire, to the opposite side, being there brazed again. A second binding was then effected outside the first in precisely the same way, and several layers of gutta percha placed over the whole by the
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, this outer investment of wire would unroll spirally without being detached from the strand. Thus the electric continuity of the strand would be preserved. The core was of rolled steel, rolled at the same time with the cable, and afterward drawn to shrivel the iron so as to leave an absolute core of approximately one inch in diameter. The outer investment of wire was really a sheath of about three and one-half turns of wire, the strands being forcibly driven into the opening made by these turns of wire, and at the same time the outer skin of wire was drawn over them, the core being perfectly protected from the weather and from injury.

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 work in the cable without being allowed to rest. The conductors which were used in supplying the cable with the core core, one of the ends 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 performance of the work is prepared, and during the work to which it is subject, we find that the pitch and tar, was compactly wound round 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 in 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 a speed well adapted to the work, and each wire was up through a hole in the middle of the table, and so 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 doing so the power of soft iron was largely lost. The extra material used, were obtained. The external investment of iron was solely designed to protect the covered core from mechanical violence during the act of submergence, and to confer upon it a convenient amount of weight for effecting its descent to the bottom of the ocean.

Each strand-machine, during the manufacture of the cable, was worked day and night, and in twenty-four hours span ninety-eight miles of wire into fourteen miles of strand. The several strand-machines, working simultaneously even twenty-four hours transformed 2058 miles of wire into 294 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 were required to be available to supply the demands of the machinery, and the works had to pause for a short space. The entire length of wire, iron and copper, spun into this wonderful structure, amounts to 335,500 miles; a length sufficient to encircle the earth thirteen times! The completed cable weighed from nineteen hundredweight to one ton per mile, and proved to be able to bear with impunity a direct strain of five tons. In the salt water the weight of the cable would, however, not exceed fourteen hundredweight per mile; and as the greatest depth of the Atlantic is only about nine miles, there is little more than two miles, 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 is the primary source of the working influence, stands Mr. Whitehouse's "Perpetual Maintenance Battery." This battery consists of large plates of platinated silver, and amalgamated zinc, mounted in cells of gutta percha. There are several plates, both of silver and zinc, about 30,000 miles. The diagrams show that the terminal bar of metal at the bottom of the cell, and all the silver plates hang upon a similar bar at the top of the cell, so that thus there is virtually but a single stretch of silver, and a single stretch of zinc in operation. Several arrangements are reserved even when the strand itself of either silver or zinc is 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 by another. The polarity of the cell is such as to cause the active plate to assume the positive, or oxidising, character, while the other plate takes the negative or oxidizing character, and the active plate is in the manner of an ordinary voltaic battery. Under this arrangement, brilliant flashes are produced, accompanied by a loud cracking sound. The points of large pliers are made red-hot in five seconds when placed between them, and iron 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 effect, or, at any rate, to check it during the transmission of electrical signals, by means of a key presenting a very large surface of metal. A horizontal bar, fastened at the top, turns backwards and forwards pivot-wise, and tills its edges against twenty flat brass springs resembling those of the key, and forming a bed for the key on each side. A constant slight leak of the current is also continuously maintained through a car of platinum wire placed in water. By this contrivance the injurious force of the sparks is mitigated, and the life of the battery prolonged. The current maintaining this magnificent tenalled Titan battery at work does not exceed a shilling per hour.

But it has been stated that the voltaic current is by no means a fleet messenger compared with other agents which are 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 a means of generating a much more powerful system, of a force to convey the energy of a more speedy traveller. The voltaic current, generated in the battery, 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 copper wire, six to eight feet long, which is wound round 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 coils are placed in this order in the cable, with a view to their proper connection or 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 round the iron to make it a temporary magnet. This coil therefore 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 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, and the coil in which it is produced is properly the transmission coil. To Mr. Whitehouse the merit is due of winding the secondary transmission coil round the magnet directly, and inside of the generating coil. By this means he means the necessary additional coil of wire increases its capacity on account of the greater propinquity. The coils are used in pairs, because each one inductively increases the power of its neighbour, and in return has its own energy inductively increased as well. The great heating power of the battery-current is rendered harmless by the size and extent of the primary coil through which it is passed. If at any time, by accident, the current find a short course for itself in consequence of the silk covering of the wire being injured, the accident is immediately indicated by the rapid rise of the temperature of the coil.

The transmission-current generated in the inner wire of the double induction-coil necessarily gets considerably weakened when it has passed through a distance of 1800 or 4000 miles. It does not do so, however. As no electrician's plan to set this weakened current immediately to work to print or record the signals transmitted. The weakened transmission-current is merely caused to open and close the outlet of a small device, the working of which is recorded separately. The strand of the cable is continued into a coil of fine wire, wound about a bar of soft iron. When the transmission-current flows through the coil, the bar becomes a temporary magnet, which has the direction of the needle of a compass (north or south) by the nature of the line negative (or positive) that is sent through the coil. The pole which is north when the transmission-current is positive, becomes south when the transmission-current is negative. Near to the temporary magnet a permanent magnet is so placed that it can travel forwards upon a wire as it is actuated by the temporary magnet. The north 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
temporary magnet is reversed, the permanent magnet is
casued 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 reverse its movement.

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
axis of support, for it then acts merely as a relay, and is
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 silicene pressed against
the tongue. These relays may indeed be ordinarily heard
clicking in action, and the tone of the instrument, 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 re-
versed, the poles of the relay-magnets are actuated different
ways. Mr. Whitehouse has made the instruments even more
effective by applying a second permanent magnet, so that it
can be made to produce a screw-action to diminish the
attraction acting on the working magnet, either way.

When the printing battery is brought into operation by
the relay, as just described, it records, by the agency of one
or more of Professor Morse's instruments. In this instrument a
ribbon of paper is unrolled from a hollow cylinder by a train
of clock-work, and as it is unrolled, a sharp style, mag-
tetically actuated, indents a series of dots or lines upon the
paper, so that the style is picked 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 dash be magnetically controlled to inscribe
the dash or the dot, it is necessary to hold up both the
magnet in action, and drawn down by a temporary magnet
formed by the printing battery current, when in operation. A
tin iron bar, enveloped by a coil of the printing battery wire,
is stronger than the spring when it becomes a magnet, and
drags 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, all the numerals of our system, the
combinations of the dot and dash can be readily caused to effect this; thus
dot and dash, — is taken to signify a; — — to signify
b; — — — to signify c; — — d; — — — e, and so on. Mr. C.
Brown's party have invented a very ingenious piece of apparatus in
which the same elements of a single wire are used, but without
issuing from a free and a strapped bell. It is possible that
this apparatus will some day be adopted by the Atlantic
Company for their service.

The British Government granted to the Com-
pany the use of the fine 91-gun ship Agamemnon for
paying out one half of the cable into the Atlantic, and con-
missioned the paddle-wheel frigate Leopard to act as its
tender. The United States Government sent over the mag-
nificent new heavy frigate Niagara, 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,
40 feet deep and 20 feet wide and deep. In this space the 1200
miles of the cable were able to be laid down on
one circular coil. The Niagara was not by any means so
adapted for the service, and had to be considerably altered
in her internal arrangements after she came over to England,
the cable even then being divided between her and the paddle-
wheel coil. The arrangements made by the engineer for the
paying out, planned that the cable should come up from the
hold of the ship, sweeping round a central block occupying
the middle of the lower coil, and then wound out and in over four
grooved sheaves. This was arranged by simply passing the
sheaves 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 embarked by
blocks, by which it was intended, so that it could be gripped
more or less tightly when ever occasion arose. Provision was
also made to register electrically the speed with which the
paying-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,
proving the maintenance of its continuity. The engineer's
calculations fixed from four to five miles as the sound. But it
was deemed impossible that the pay-out of the cable should be effected. 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
ประธาน in the operation, at which was deemed possible. A small journeyman engine
was prepared for accomplishing this picking-up labour.

Provision was also made for dropping the portion of the cable
in the act of being submerged to the bottom of the sea on
the return journey, so as to be ready for use at any moment when
the storm was past, the dropping being accomplished by
means of very strong supernumerary ropes kept ready for the

The end of the month of July was selected for the accom-
plishment of this wonderful enterprise, because Lieutenant
Maury 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. The presence of either fogs or icebergs, and gales
of wind are almost unknown at the period, excepting just off
the western coast of Ireland. Lieutenant Maury also marked
out the track the vessels ought to endeavour to take. The
degree of latitude running from Newfoundland to the track
running directly from Trinity Bay in Newfoundland to
Valentia Harbour in Ireland. But all practical navigators
are aware that it is altogether impossible to direct a ship
across a true great circle track. Such a track would require
the course one restricted to a quarter of a point of the
circle, 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 two would have met exactly at the end of the track, with
no errors approaching to this amount. Lieutenant Maury
consequently planned a polygonal route from Valentia Har-
bour to Trinity Bay, in which there were only six changes
of track one restricted to a quarter of a point of the
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red Asia. It is continued in the Northern Pacific through the
Island Lines, and it stretches at the bottom of the Atlantic
as a sort of submarine shelf from Cape Race, in Newfoundland
and Cape Clear in Ireland, Newfoundland and the British
Islands being really projecting extremities of the higher portion
of the shelf. This plateau rests precisely in the course along
which the telegraph cables follow; and, after having been
washed along by the Gulf stream, until they were finally
dropped in this region as a kind of perpetual snow storm,
consequent to the passage of water from rapid onward move-
ment, into fluid that is comparatively at rest. There the
remains of organized existence are brought up by the deep
sea plummets prove to be so perfect notwithstanding their
fragility, that there can be no doubt the depth where they
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
plains, and described it as being smooth and slightly inclined
from the upper to the lower atmosphere. He revised these 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
preservation that is to be looked for; and this is a conclusion
that can be reported a greater degree of density in the depths
of different positions than Lieutenant Berryman had conceived.
On the 6th of August, 1857, operations commenced. There
were present, Captain Agassiz, 'Nature'; Agassiz's opera-
tions, 'William Mind', and 'Advice', six steamers intended to
assist in various parts of the operations. The shore-end of the cable was taken on shore from the 'Nia-
gara,' by a number of boats. And then took place a ceremonial
inauguration of the lines of Lord-Lyndhurst of Ireland,
landing the extreme end of the cable, and drawing it into
to a tent where electrical batteries had been placed, on
the beach of Valenicia Harbour. The engineer was doomed, how-
ever, to a mortifying disappointment. A slight accident
happened to the cable on this trip, 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 in the following the voyage by boat by
hour. On the 11th, however, the engineer found that 335
nautical miles, or 380 statute miles, of cable had been sub-
merged; and, knowing that that was far too much in
proportion to the straight line distance, he concluded there was
also a break. The commission to the middle of the cabled
ination of the grip of the machinery was therefore made; and
this modification appears to have been unskilfully attended to
by one of the subordinates. The cable was stretched too
ightly; it snapped, 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 at this time, March 1858,
for immediately resuming the attempt. The lost
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 the national enterprise.

Electrical Telegraphs now render useful service in several
cities of America. In New York eight bell-towers are con-
ected with each other, and with the central tower over
the City Hall square; and a bell at these places
uates 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
circumvent route from this station; one, ingeniously arranged
on the same standards, is made to ringing the fire-
bell towers in the city, where it acts 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
all of these signal-stations is a box containing a magnetic appa-
tratus, 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 sta-
tion; 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 information besides that of
fires, may be disseminated throughout the city by similar
means. There are about forty-five miles of wire in this telegraph
at Boston. There seems every reason to believe that, now
the telegraph wires follow so many sub-way routes in the
Capital of the United States, they 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 fre-
quent as is the electrical phenomena of water and certain
water animals. Of the former species there is one
that is now known to exist between the great forces of nature,
as Light, Heat, Chemical Action, and Electricity, it is
perhaps master of surprise that so few electrical phenomena
are exhibited by organic beings.

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 distur-
bage was discovered, but when the seeds began to sprout
a gold-leaf electrometer had its leaves separated at least half
an inch from each other. Pouillet concludes that the vegeta-
tion on the surface of the earth must produce a vast amount
of electricity, and be an active cause of its phenomena in
the materials that it surrounds; for instance, they have
observed that the wires in the bark and pith of a growing tree,
have obtained decided indications of the presence of a galvanic
current. These exhibitions of electric disturbance are undoubt-
dedly dependent on the chemical changes going on in the plant,
and the continued growth, but this is not the force in nature
representing another. Under the influence of heat and light
the electric and attractive forces are brought into play, and
the motile force of the growth of the plant as well as all
other phenomena that can be ascribed to them.

In the Animal Kingdom the same indications 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 heart or the reproductive organs. Experimen-
ters have obtained similar results. It has been
supposed that these phenomena were due to the chemical
changes going on in the body of the animal, but they cease
on the death of the animal. Free electricity is ex-
cited by the movements of the human body. There is
made evident by rubbing the feet on a woollen rug, when,
on applying 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.
Carpenter says there are persons "who scarcely ever pull off
articles of dress which have been worn next the skin without
sparks and a crackling noise being produced, especially
in dry weather."

Recent experiments of 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 move-
ments, first observed by his wife, induced in a frog's leg by
plates of copper and zinc, to a purely animal action. Volta
showed that the movements observed by Galvani were de-
dependent on the chemical action developed in the metals.
Matteucci observed the peculiar sensibility of the nerves and
muscles of the frog to galvanic action, and made use of the
leg, preparatory to this development than others, 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
inclosed in a glass cylinder, covered with an insulated
nervous, and the nerve allowed to hang freely at its open end.
When two points of the nerve were thus prepared were 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 galvanization of the nerve he could produce
creants 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
arrived at the following conclusions:—1. That galvanic cur,
rents 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 differen

2 D 2
individuals of the same species. 2. The electro-motive action on which these currents depend does not arise from the nervous system. The currents as composed of the different tissues, the nerves, muscles, and tendons, in an electric point of view, are quite homogeneous. 3. These currents are produced by the muscles. If any undissected muscle of any animal be brought into the circuit longitudinally, the excitation is always found to act in 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. 4. The law of the muscular current may be expressed as follows: "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-meant transverse section is affected by the muscular current 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 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. 6. The nerves are possessed of an electro motive action according to 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 passing through a single point.

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 doubtful) 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 two of the most peculiar branches of the class, and 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 Sirturus (more correctly the Malapterurus), which approaches more nearly to the Salmon tribe, is the parent of the Serpent, Trichurus, or Indian Sword-Fish, an inhabitant of the Indian seas; and the Tetraodon (one of the genus allied to the Diodon, or Globe-Fish) has only been met with on the coral banks of Johanna, one of the Comoro Islands. These fishes have a vast number of varieties with the same organs, and 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 is the power of giving to any living body which possesses the shark 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 when 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 into action, even in vigorous individuals. It usually diminishes 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 the electrical forces conveyed into 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, they 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 arrived at by different inquirers:—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 these fish, it may be supposed that an electric discharge is sent along the nape of the fish, acting upon the organs of the senses; and in such manner as is essential to the 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 both the back and the belly, and the head and the tail; the point of the shock to the sensitive 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 differ from each other in size, they are all single pointed, 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 head, because the discharge is then more than one can stand; but when both surfaces are placed together, the fish will not attempt to make the two surfaces touch, but will be content with the feeling produced by one point of the organ being touched; and he adds, that if one surface is touched and the other is not, it will be done by a fish. If a fish be placed between two 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 are placed in water the shock is experienced, and if placed on the back and in contact on one side, the fish itself will turn over so that one of its sides is placed against the opposite plate, and the discharge is then felt. The situation of the electrical organs of the Gymnotus is 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 the connection is formed between these two extreme points.

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 of the body. These organs are divided among various animals, and are organs of a flattened shape, and occupy the front and sides of the body, forming two large masses, which extend backwards and upwards from each side of the head. They are in the Sirturus there is no electrical organ so developed as those just described; but the thick layer of dense cellular
tissue, which completely surrounds the body, appears to be subservient to this function; it is composed of tendinous fibres interwoven together, and of an alkaline 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 nerves 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 by the name of Mignone's ganglion. It has been given; the first two of them issue from the cranium in close proximity with the fifth pair, 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 elec-

trical 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 Sphyrna are considered as arising from the spinal marrow and the sides of the intestines. 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 will remain unimpaired. If the trunk be destroyed on either or both sides, the power is retained 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 sepa-

rated by a thread are capable of exciting the electrical properties. Discharges may be excited by irritation of the brain when the nerves are entire, or of the portion of the divided trunk distributed on the organ; but on de-
stroying the electric lobe of the brain the electric power of the whole organ will remain. All the other ganglionic centres may be removed without impairing it. It is remark-

able, however, that after the section of the electrical nerves Torpedoes appear more lively than before the operation, and acted on the flagellate five longer than others not so injured, which are excited to discharge frequently. Poisons which act violently on the nervous system have a striking effect upon the electrical manifestations of these fishes; thus, two grains of musarum of morphia were found by Matteucci to produce death after about ten minutes, during which time the discharges were very numerous and powerful; and stychania also excited powerful discharges at first, succeeded by weaker ones, the animals dying in violent convulsions. When the animals were perfectly dead, and had no signs of life, the slightest irritation occasioned discharges; a blow given 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 caused the discharges. Matteucci observed that the electric power is suspended when the Torpedo is plunged into water at 32°, 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 69° the Tor-

pedo 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 over no one organ, but rather in the whole body. From this it has been sometimes hastily inferred that the electric and nervous 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-

mena appears to be the correlation of these forces. They are convertible forces, the one being capable of generating the other; the force generating being always the representative of the force generating it. The use of these electric organs is unknown; and it is stated that the discharges are given when few of the fishes which it kills by its shocks, and this is the case with the Torpedoes. Dr. John Davy conjectures that the electric discharges decompose the water, and supply oxygen assist in respiration. Dr. Carpenter suggests that this peculiar gastric action of this organ, which we observe in 1800, in which he was at least partially. His honest and manly nature ever disdained as much to trample overbearing on the humble as to crouch meekly before the powerful. He despised business with great celerity, and for the most part with success. But causes were not set before him with that clearness of his mind and parti-

ties were not suffered to bring forward all they had to state with that fulness and freedom, which alone can prevent miseducation, and ensure the due administration of justice. [Carpenter, Principles of Physiology, General and Compar-

ative; Professor Matteucci, Electro-Physiological Researches; Philosophical Transactions, 1850; Matteucci, Lectures upon the Physical Phenomena of Living Beings, translated by Perier; Du Bois-Raymond, On Matteucci's Letter to Dr. Bence Jones, Abstract of Du Bois-Raymond's Researches in Animal Electricity; H. Bence Jones, Abstract of Du Bois-Raymond's Researches in Animal Electricity.)

ELEOTRIS, a genus of Acanthopterygious Fishes belonging to the family Gobidae. Like the Oubies the species have flexible and pointed first dorsal fin, and an appendage 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.

E. doratrus, the Sleeper, is a large fish. It is found in the West Indian marines. Other species have been found in Africa, India, and the Mediterranean.

ELIDONE. [SPiGROD.]

ELLENBOOROUGH, [CUMBERLAND.]

ELLENBOOROUGH, LORD. Edward Law was born November 16, 1750, 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 residence of the late Peers of Cumberland, and the late Rev. Mr. Christian, who then resided at Docking in Norfolk. He was re-

moved thence in 1762 to the Charter-house School, London, and placed on the foundation. In 1768 he was entered of Cambridge, and on February 11, 1772, taking his degree of B.A. he removed to London, and became a student in the Inner Temple. Having been called to the bar, and ac-

quired by a short preparatory practice the needed technical knowledge, he soon took his place among the chief members of the profession engaged in the defence of the revenue-witnesses. In April 1791 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, of Ellinborough in Cumberland, by patent dated April 10th, 1802. He was afterwards made a privy counsellor. 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 commis-

sioners to negotiate with the Prince of Wales. In 1814 he was one of the judges who presided at the trial of Lord Cochrane, and in 1818 on the trial of Hone. [Hone, William, £.I.] In November of the same year he retired from the bench. He died December 13, 1818, at his seat, Ellinborough, and in 1820 he 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 individual's capacity during the eighteen years that he filled the first place among the English common-law judges. ... He was sometimes irascible, and sometimes even violent. He was nothing but one of the most manly and sincere of men, and his honest and manly nature ever disdained as much to trample overbearing on the humble as to crouch meekly before the powerful. He despised business with great celerity, and for the most part with success. But causes were not set before him with that clearness of his mind and parti-

ties were not suffered to bring forward all they had to state with that fulness and freedom, which alone can prevent miseducation, and ensure the due administration of justice."

ELLESMERE, [WORCESTERSHIRE.]

REVISED BY N. LAWSON GOWs was born in London, January 1, 1800. He was 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 married to Miss Julia Harri-

Sans in Surrey, since 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
once reprinted before the author resolved to withdraw it from circulation. It had been more than a year since 1785, when he had been followed by 'Translations from the German,' and Original Poems, by Lord Francis Lewson Gower; £8o, London, 1824. This small volume consists of translations of seven lyrical poems by Schiller, one by Güste, one by Gailis, and three by Körner, and six of the original poems. He was M.P. for Sutherlandshire from 1826 to 1830. In 1827 he was made a lord of the treasury. From January 1830 to July 1830 he was chief secretary for Ireland, and from July to November 1830 he was secretary at war. On his death of his third wife, in 1835, having received as his inheritance the Bridgewater estates, which his father had inherited from the last Duke of Bridgewater, he assumed the name of Exeter. From 1835 to 1846 Lord Francis Egerton was M.P. for South Lancashire. In the autumn of 1839 he commenced another translation, 'Voyage round the Mediterranean.' He wintered at Rome, whence he sailed for Malta in April 1840, and having landed on the coast of Syria, made a tour in Palestine. In 1841 he was elected rector of the university of Aberdeen. In 1843 he published 'Mediterranean Sketches, by Lord Francis Egerton,' 12mo. In this volume the poem called 'The Pilgrimage' records some of the most interesting impressions of his tour in Palestine. It is followed by extracts from his journal and letters, and a new edition of the original poem, with several additions, was published in 1858, 'The Pilgrimage, and other Poems,' 4to. In 1846 he was created Earl of Ellesmere and Viscount Brackley, titles nearly corresponding to those of his lordship, the Earl of Ellesmere; who, at the time of his death, bore the title of Viscount Bridgley, Lord Hardwicke previously held that of Baron Ellesmere. The Earl of Ellesmere was elected President of the Antiac Society in 1849. In 1855 he was created a knight of the Garter, and in the same year was appointed colonel-commandant of the Lancashire yeomanry cavalry. He was also deputy-lieutenant of Sutherlandshire. He died Feb. 21, 1857.

Besides the works before mentioned, the Earl of Ellesmere published the 'Camp of Wallenstein,' and other Poems; the poems of the Beppo, the 'Sieges of Vienna by the Turks,' from the German of K. A. Schimmer, and other sources, 16mo, 1847; 'Military Events in Italy,' translated from the German, 12mo, 1851; 'Life and Character of the Duke of Wellington,' 12mo, 1852; 'History of the Two Tartar Conquerors of China,' from the French of J. P. D'Orleans, 8vo, 1854.

The Earl of Ellesmere, at his residence, Bridgewater House, Cleveland Square, London, had one of the very finest gardens of the metropolis, and possessed, besides the residence, an extensive and beautiful park.

Kingdom. He inherited the chief portion of it as a part of the property of the Duke of Bridgewater, but he made some additions to it himself, and in a very handsome manner he made it accessible to the public. We ought to mention that his lordship has a very great respect for the ancient poet, Shakespeare, known as the Chando Shakespeares, with a view to its forming a portion of the projected National Gallery of Portraits.

ELLIOTT, EBBENEZER, the Corn-law Rhymer, was born March 17th, 1781, at the New Foundry, Marsbo, near Rotherham, Yorkshire. His father, a clerk at the foundry, was an ardent politician, and a stern ultra-conservative disserter of the Bovem sect; and he employed his 'brother Herean, Thomas Wright, the Barnsley tinker,' to baptize his son—as the poet relates in his 'Autobiography,' published soon after his death in the 'Athensum' (January 18, 1850). The elder Elliott (also an Ebenizer) was accustomed to go into his own room every fourth Sunday, to persons of a similar persuasion, with great oration within or about the four miles to hear him, and on the week-days he 'ioy delight, to declaim on the virtues of slandered Cromwell and of Washington, the rebel,' as he pointed to prints of them while hugging on the hearth, and he expressed that 'is the key which will unlock all the future politics' of the Corn-law Rhymer. The young Ebenezer was regarded as a dull child, loved to be alone, made little progress at school; where he could never master grammar, or attain to vulgar fractions, and he had been in confirmed dunces; and eventually, out of sheer hopelessness, was sent by his father to work in the foundry. At the foundry work, however, he was thought to be even cleverer, but his father did not know he adopted also the workman's evil habits, and for a while gave way to intemperance. But from sinking into thoroughly vicious courses his early love of nature saved him. A copy of Shenstone's 'English Botany,' lent him by a friend, led him to collect botanical specimens and after a while he became interested in poetry that treated of his favourite flowers, and court scenes. He soon became a diligent reader, studying 'after Milton, Shakspere—then Osian, then Junius,' and so on, while much of 'Barrow,' he says, 'I was far too young to understand and too unproficient to condense.' In time too he began to write verses himself, though his early efforts, he confesses, were unsuccessful; and he set himself doggedly to learn in his own way grammar and even French, but could master neither. Mean- while he was employed as a clerk, and had been induced to purchase the foundry business on credit, and from his sixteenth to his twenty-third year Elliott "worked for his father as laboriously as any servant he had, and without wages, except an occasional shilling or for a night's lodging, and he was accepted as his apprentice, and he passed (in his seventeenth year) his first published poem, the 'Vernal Walk;' this was followed soon after by 'Night,' 'Wharrcliffe,' and others; and Elliott, between his rhymes and political, began to be a local celebrity. He had the good fortune to form the acquaintance of Southey, who was earnest in giving him the full benefit of his own wide experience in poetical studies, and Elliott was in after years proud of proclaiming that Southey taught him poetry. Happily for his purposes, he did not let his respect for the genius or his gratitude for the kindness of the laureate lead him to become an imitator, or to tame down his wild notes to the orthodox tunes. Between 'Wharrcliffe' and the 'Corn-law Rhymes,' he published in 1823 'Love,' and another poem, accompanying 'Earl of Ellesmere,' 1854, which was a volume of poems written by his lordship on the death of his son.

Elliott's father was too much hampered by the liabilities he had incurred, and his want of capital, to carry on the foundry with success. After a time young Elliott commenced business on his own account. A battle of both houses of Parliament, falling there he removed to Sheffield, where in 1818, he, at the age of forty, recommenced the battle of life as a barista merchant, with a borrowed capital of 1001. Here he had a series of commercial successes, built himself a handsome residence in the city, and his enterprising spirit of the flourishing business till the great panic of 1837, when heavy losses caused him to contract the scale of his dealings. He finally withdrew from business in 1841, and retired to a pretty country residence he had built for himself on an estate of Great Tunbridge, near Tunbridge, and there he resided at ease in his circumstances, in the centre and oracle of a circle of admiring friends, till his death, which occurred on the 1st of December, 1849, having lived to see the first season of the Oxford University Press, the country which he had laboured so earnestly to bring about.

Elliott says of himself, in the 'Autobiography' already quoted: 'There is not in my poetry one good idea that he thought to be a bad, or that he falsely put into print. It is to be observed that many of them are of some passing event, or was written to serve some temporary purpose. None of it is the result of a long meditated design, or the completely formed issues of a vivid and vigorous imagination; or, on the other hand, the unpremeditated melody of a heart imbued with happy thoughts and fancies—singing as the wild-bird sings. Nevertheless it is true poetry, albeit often very harsh and ragged. It is the passionate protest against wrong—the fiery remonstrance with the wrong-doer—spurning the cold incumbrance of peace and inviting to the battle of life in the current of the free flow of poetry. The great public evil that came nearest home to his own hearth, that as it seemed to him, which was inflicting dire mischief on the labouring classes of his country, and which was undermining the prosperity of the manufacturing structures of the country and as he believed, of the country generally, was the Corn-Laws; and he resolved to set forth the mischiefs those laws were producing, and the greater dangers they were threatening. He had, therefore, long ago commenced to view the 'Corn-law Rhymes' began to appear in a local paper, and their effect on the hard Yorkshire artisans was immediate and lasting. And their influence was assuredly well-earned. Rude and rugged in language, intensely bitter, often as might be expected, inaccurate and sometimes unjust in their denunciations, they yet showed
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 impos-
and the most direct words, were yet conveyed in
genuine music, which made its way at once to the heart.

The respect and the applause which was offered to the general public they were equally successful.

The 'Corn-Law Rhymes,' published in a single volume with 'The Raster,' at once made Eliot's name famous. Many people began to pass along the street 
language was occasionally objected to, but it was generally felt 
the language was really a part of the man. Noticing 
the objection in the preface to a new edition of the Rhymes, Eliot asked, "Is it strange that my language is fervent 
as a welding heat, when my thoughts are passions that rush 
burning from my mind like white-hot bolts of steel?" But 
while, this a sufficient explanation of what reads so like excessive vehemence, serves really to take off the edge of his poetic declaration, while it destroys the impression of his prose, as placing within the category of passion which ought to be the result of reason. Eliot followed his 'Corn-
Law Rhymes' by publishing in 1839 the 'Village Patriarch,' another but longer corn-law rhyme, much the best of his longer pieces, a work in which, with many other 
he is a great master of prose is the ability to write in a way 
and his name has been known, the superior power to 
ought to be the result of reason. Eliot followed his 'Corn-

EMB.

ELM.

due to Mr. Cockerell, 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 introduced by A. W. Pugin into the Work of the first half of the century. 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 been given for many years that the Gothic was out of date in itself, whilst at variance with modern requirements, as to be in itself the cause of the failure in certain ambitious pro-
ductions. Elmes, however repeated the proof how 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-
and merit of his exertions. An average of 400l. a year, subject to deductions for travelling, clerks, office and other heavy expenses, left little of the £2000 which he received from that work which forms the chief adornment of a rich provincial town; and after his death a subscription was raised to provide a moderate income for his wife and child.

ELODIANI. [Tortuosa.]

EMBERIZIDÆ.

Family of birds belonging to the order Insectivora and the tribe Conirostræ. The most distinguishing genus of the family is Emberiza. It comprises however other genera. The general relations of this family are given under Passerinae. We shall confine ourselves here to the British genera of this family known under the name of Buntings.

Plectrophanes.—Buck short, thick, conical, the edges of both mandibles slightly curved inwards; upper mandible smaller than the lower, with a small palatal knob. 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 the tarsi of moderate length; anterior toes divided; lateral toes equal in length; hind toe strong; claw elongated, and nearly straight.

Lepidopicus (Gould), the Lapland Bunting. It is the Emberiza lapponica and E. caesia of other writers. Though a native of the arctic regions, Mr. Yarrall records five instances of its being taken in Great Britain. It is found in Siberia and near the Uralian chain. Towards win-

Lepidopicus.—Buck short, thick, 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 rounded, partly hidden by small feathers at the base of the bill. Wings of moderate size; the first quill 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. miloti, 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, it is frequently called the Corn-Bunting. It builds its nest in April, and lays from five to eight eggs; which are of a reddish-brown, purpled ground, streaked and spotted with dark purple-black. It feeds on the seeds of the grasses, of the Polygonum, of sorrelles, and of cereal plants; also on Coleopterous Insects.

In the plumage of this species the upper parts are of a light yellowish-brown streaked with blackish-brown, 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 belly elongated and; a bistre or brown. E. schenckii, the Reed-Bunting. It is also called, according to MacGillivray, Black-Headed Bunting, Reed-Sparrow, Water-Sparrow, Ring-Bunting, Ring-Bird, Ring-Fowl, and Gholo. It frequents marshy places, where it is seen perched on willows, reeds, sedges, and other aquatic plants. It feeds on insects, seeds, and small Moluscus. 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 tortuose 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 Yellding or Yolding. Yellow Yowley, Yellow Yie, Yeildock Skute, and Devil's Bird. It is a permanent resident in Great Britain, in cultivated and wooded districts, where it is well known. The back and wings are light chestnut-brown, the central part of each feather brownish-black. The nest is composed of coarse grasses and twigs, neatly lined with fine grass, fibrous roots, and hair; 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. cirrus, the Chir-Bunting. This bird is not so common in this country as the last, which greatly resembles. It was first distinguished as a British bird by Colonel Montagu. It is a rare visitor to the south of Europe, and is more frequent in the south of England than in the north. 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.)

EMIGRATION. One of the most remarkable facts in the history of Great Britain is the rapid increase of the population. This increase in the kingdom has been 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 been stationary; Great Britain has increased 10,000,000, as given in the census of 1801, to 20,900,000 in that of 1851; and in the middle of 1856, the Registrar-General estimated the population of England and Wales alone at 19,044,000: 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 progress. In forty-two years, from 1815 to 1856 inclusive, during which an account of avowed emigrants has been taken, 4,470,319 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, North America, 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 dominion that can afford anything like a parallel, and even that is indebted to us for 2,703,782 persons, who have proceeded thither, the greater proportion of whom have been from Ireland, and chiefly from the year beginning with 1847. The annual average of emigration from 1815 to 1842 was 62,500; from 1847 to 1856, it was 279,816. It should be added, 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. (See under the title 'Census', and under the heading 'Emigration' we gave a table of emigration to 1856, which we now complete to 1856:—

In 1857 the total number of emigrants from the port of Liverpool only, was 155,652; of these 9788 were for the North American colonies; 100,948 for the United States; 29,651 for Australia and New Zealand, and 324 for other places. Of these emigrants England supplied 60,898; Scotland, 6161; 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, proceed 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. We have accordingly omitted these, and only calculated the number of emigrants who landed in the United States as being 117,000.

The numbers given for Canada are from the Census of 1851 for Western, and the official returns of 1858 for Eastern Canada: the estimated numbers of both in January 1857, were 2,500,000. 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 and Cape Breton, for the year 1854; and for Newfoundland, for 1854. All have increased since the returns. For Newfoundland the numbers are taken from the Census of 1845, and in 1857 the increase was estimated at 10,000. For Bermuda the authority is the official return of 1853.

In Australia:—

<table>
<thead>
<tr>
<th>State</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td>30,129</td>
<td>24,560</td>
<td>54,689</td>
</tr>
<tr>
<td>Victoria (Acton Pophill)</td>
<td>23,421</td>
<td>18,743</td>
<td>42,164</td>
</tr>
<tr>
<td>South Australia</td>
<td>24,464</td>
<td>18,544</td>
<td>43,008</td>
</tr>
<tr>
<td>Western Australia</td>
<td>9,256</td>
<td>4,282</td>
<td>13,538</td>
</tr>
<tr>
<td>Tasmania</td>
<td>4,100</td>
<td>1,079</td>
<td>5,179</td>
</tr>
<tr>
<td>New Zealand</td>
<td>6,105</td>
<td>1,079</td>
<td>7,184</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, 980 troops, and 19 aboriginals. The population of Victoria on Dec. 31, 1857, was 334,000 more than the above return, was estimated at 319,379; and on Dec. 31, 1857, at 467,000.

In India:—

<table>
<thead>
<tr>
<th>State</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape of Good Hope (Western Division)</td>
<td>71,091</td>
<td>63,957</td>
<td>135,048</td>
</tr>
<tr>
<td>Cape of Good Hope (Eastern Division)</td>
<td>4,917</td>
<td>4,917</td>
<td>9,834</td>
</tr>
<tr>
<td>Natal</td>
<td>14,423</td>
<td>3,857</td>
<td>18,280</td>
</tr>
</tbody>
</table>

The returns of these colonies are for 1853 and 1854; and in Natal the numbers given are exclusive of 112,988 settled natives.

In these three divisions of the British colonies, there are now 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; and some of the emigrants become mixed with an older and in some cases a
coloured or foreign population, we cannot trace the British element so clearly. The effect has been so far good, that the inhabitants of the North American and Australian colonies are, with the exception of the United States, among our best customers. It is not remarkable, therefore, that so much attention has been paid of late years to the subject of the transmission of emigrants thither, and of means for enabling them to settle there in comfort. Government, accordingly, has undertaken to a considerable extent thebusiness of the emigration question, and has provided for emigration was appointed. This officer introduced many judicious plans for rendering the passage of emigrants across the ocean as free as possible from discomfort, and a code of rules was framed to secure this and other objects. The functions of the officers for emigration are now exercised by the Land and Emigration Commissioners. Emigrants are also protected by the Passengers’ Act. The Act 6 & 8 William IV. c. 5, passed in 1833, having proved insufficient for the purpose, several amended acts were passed, of which the latest is the 18 and 19 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 consumption, and to prevent perjury, and to ensure 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. Under this Act, by the 28th day of every month, the agreement, the Passengers’ Act compels the captain to victual the emigrants 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 Passengers’ Act, government emigration agents are appointed for the ports of London, Liverpool, Plymouth, Southampton, Glasgow and Greenock, Dublin, Cork, Belfast, Tralee, Derry, Hull, Liverpool, London, Chatham, Medway, and 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 on board; they know the emigrants, and whenever applied to for that purpose, 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 Passengers’ Act are strictly complied with, viz., that passenger-vessels are sea-worthy, that they have on board 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 passengers bound for the tropics, they assist them in arranging their affairs, 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.
Neu Brunswick.—St. John’s, St. Andrew’s, Chatham (Miramichi), Bathurst, Dalhousie, and Richibucto.
Australian Colonies.—Sydney, Moreton Bay, Melbourne, Geelong, Portland Bay, Hobart Town, Launceston, Perth, Fremantle, Adelaide, and Auckland.
Cape of Good Hope.—Cape Town, Port Elizabeth, and Simon’s Town.

The duty of these officers is to afford gratuitously to emigrants assistance 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 now limited, 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 benefited. The largest, and most suited for the wants of the colony may be procured and sent out. In deciding what clauses 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 State. The Commissioners are occasionally also able to grant passages to Western Australia; but they have no funds for assisting persons wishing to emigrate to the North American colonies. In British Guiana, the Governor, under Ordinance No. 7, 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 advice, 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; 5 & 6 Vict. c. 51; 12 & 13 Vict. cap. 103; and 13 & 14 Vict. c. 101). In some years large numbers of emigrants were 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, together with interest at 5 per cent, if the emigrant consents to emigrate, refuse to do so after the expenses of emigration have been incurred; and the loan is also recoverable if persons who emigrate shall return to this country.

In 1856, under 13 & 14 Vict. c. 105, the guardians of any parish or Union are empowered to expend out of the rate fund, of 10/- upon the emigration of any poor person belonging to the parish or to any parish in the Union, without the necessity of a parochial meeting to give their consent. But the gross amount expended must not exceed the limit fixed above, and the majority of the Guardians of the parish of the settlement must express their concurrence in writing in the resolution of the Board of Guardians for such expenditure. This written concurrence must be transmitted, together with a list describing the proposed emigrants, to the Poor Law Board, who are to issue their order to confirm the resolution. The 13 & 14 Vict. c. 101, sect. 4, enables Boards of Guardians, under similar restrictions, to expend money in and about the emigration of persons or children under sixteen having no settlement, or whose settlement is uncertain. 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 are inserted 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, or the Mediterrenean, and that the emigrant shall undertake to expend 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 land 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. They are limited to a certain number of the respective British colonies. In New South Wales 51,736 persons were introduced from 1831 to 1842 under bounties. The mode in which unoccupied land is disposed of in the colonies has a most important bearing on the health and welfare of immigrants. By the application of a general principle of law, the waste lands in the British colonies were considered to be vested in the Crown, and that every private title must rest upon a royal grant as its basis. But since 1831 another principle has been established, that the Crown holds the lands in question for the purposes of the public good, not merely for the existing colonists, but for the people of the British empire collectively. It must be noted that the following Act and its provisions (Appropriation of Land Sale Act for the Australian Colonies (15 & 6 Vict. c. 36)) 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 colonics. The mode of selling land varied from place to place, and was determined by the occupation of the land under the name of quit-rents, money payments, or the cultivation of the soil; but these conditions were not effectually enforced, and in fact it was generally found impossible to enforce them. Large grants of land were made, and as cultivation was not enforced, and no roads were made through these tracts, they interrupted the course of improvement. Under the old system, lands in the colony of the Cape of Good Hope and Port Jackson were granted to individuals. One western acres, have been disposed of for less than 46,000£. 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 'present Government prevented 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. Buller, 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 Canada, 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 refused the request of the removal thither of emigrants from this country, when the land-income 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><strong>North American Colonies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (West)</td>
<td>Fixed price</td>
<td></td>
</tr>
<tr>
<td>Canada (East)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>Annuity and private sales</td>
<td></td>
</tr>
<tr>
<td>New Brunswick</td>
<td>Ditto</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><strong>Australian Colonies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New South Wales</td>
<td>By Auction</td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tasmania</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>New Zealand (Crown lands)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cape of Good Hope</td>
<td>Annuity, subject to be fixed</td>
<td></td>
</tr>
<tr>
<td>Natal</td>
<td>Ditto</td>
<td></td>
</tr>
<tr>
<td><strong>New Zealand (Crown lands)</strong></td>
<td></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 10 Vt. Law, and are being sold at the rate of 16s. per acre. They are now thrown open for public sale. The lands reported by the chief agent for emigration at Quebec to be most worthy the attention of emigrants, are the townships Pei, Welessley, Maryborough, and Mornington, covering an area of 200,000 acres, in the county of Wallace. The prices of land in these townships (as of all Clergy Reserves), are regulated by the quality of soil and situation, and average from 5s. to 10s. currency per acre, one-tenth of the purchase-money, usually the amount of such sales towards the cost of the erection, which is usually about 1s. per acre. The sale is to be 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 actual settlers upon the payment of five years' purchase, consisting of 10s. per acre, payable in ten equal annual instalments, with interest. The first instalment to be paid upon receiv-
each of the colonies in which they offer land for sale." The Commissioners in pursuance of this object issue occasionally a 'Colonisation Circular,' which contains matter calculated to be of essential use to emigrants or persons who intend at some future day to settle in the colonies. EMMETT, a name used by early English writers for the Ant. [ANT.]

ENAMEL (of Teeth). [Tissues, Organic, S. 1.]

ENCEPHALANTOS, a genus of Plants belonging to the natural family Euphorbiaceae, the species being found in Africa. Like many of the other forms of Cynadaceae plants they yield starch in their stigmas, which are prepared by the natives and eaten; hence these plants are known by the name of Cassava-Root or Kaffir-Root.

ENCHELIS, a genus of insularialmecales. The species E. sanguinea and E. puticulus, according to Meyer, form the Red and Green Snow-Plants which have been described as Conferta, and referred to Protococcus. [Snow, Ekn.]

ENDOMOSIS, a name given by Durochet 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 protoplasmic cell-membrane; and the other is the mutual diffusion of miscible fluids. From the investigations 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 result of the imbibition of one of the fluids which are absorbed by solid 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:

<table>
<thead>
<tr>
<th>Solution</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution of Carbonate of Potash</td>
<td>85 millimetres</td>
</tr>
<tr>
<td>Solution of Sulphate of Copper</td>
<td>75</td>
</tr>
<tr>
<td>Serum of Blood</td>
<td>70</td>
</tr>
<tr>
<td>Solution of Carbonate of Ammonia</td>
<td>62</td>
</tr>
<tr>
<td>Distilled Water</td>
<td>60</td>
</tr>
<tr>
<td>Solution of Common Salt</td>
<td>55</td>
</tr>
<tr>
<td>Milk</td>
<td>55</td>
</tr>
<tr>
<td>White of Egg, diluted with its own volume of water</td>
<td>35</td>
</tr>
</tbody>
</table>

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 placed in freshly opened tubes of atmosphere, any imbibition took place, and it was but little more when strong saline solutions were used. The degree in which different fluids pass into different solids will be seen in the following table:

<table>
<thead>
<tr>
<th>Material</th>
<th>Poured Glass</th>
<th>Saw-dust</th>
<th>Alcohol</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>85 mill.</td>
<td>176 mill.</td>
<td>183 mill.</td>
<td>60</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 the above experiments is essentially the determining result. The fluids rose 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. Processes of diffusion and absorption are essentially analogous. The fluids which pass through the pores of the seepum, which is not equally penetrable by them, then the one which is most readily imbied will tend to occupy the capillary passages of the seepum, and will thus come into contact with the liquid on the opposite side. This combination will pass until both fluids are represented in the pores of the seepum; 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. In the same way then an endosmotic 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 seepum have for the two liquids.
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 mixture placed on one side through the other, takes place 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 both, and which is not restored to the septum, which 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 Endosmose. Thus it happens that the direction of the principal current, which is determined by the attractive power of the septum for one or for 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 are both present, and composed of animal membrane, the endosmotic current will be from the water towards the alcohol, because the former liquid 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 castor-oil, the endosmotic current is from the alcohol towards the water, because the former is most readily imbibed by the septum. It has further been ascertained by the experiments of Matteucci, that when an organic membrane is employed as the septum, the current is in a direction entirely 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, though the endosmotic current from the water to the sugar, yet this current was so 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 principal current was found to be with this side, as to raise the liquid in the tube to 130°; whilst if the internal (or mucous) surface of the membrane were placed in contact with the alcohol, and the muscular 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 Proctor, the casein is the casein, the casein; the casein with fresh membranes, Endosmose 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 sarcinical 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. When membranes are employed 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-organised membrane that it is not repelled by the pressure 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 previous hypothesis; though if the liquids have a strong tendency to mutual diffusion, 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

which it traverses the membrane; thus, when sugar, albumen, or gum, was employed in solution, its transudation towards the external surface, of all the skins examined by Matteucci, a fact which is without its significance, when it is remembered that it is in this direction that the secretion of mucous takes place on the skins of fishes, frogs, &c.

"Another fundamental fact on which is based the phenomenon of imbibition 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 absorption is merely the peculiar consequence of a difference of pressure; and that it occurs save during the continuance of life. But this is not true, since imbibition will take place into dead tissues, though more slowly than into some parts when living; and the reason of this is perfectly explained by the difference of the condition between a mass of tissue, all whose fluids are 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 is immersed for some hours in a solution of salt, little or no change of size will be found that every part of the viscera is so penetrated with the salt, that by touching it with a glass rod moistened with a solution of chloride of iron, a more or less deep blue stain is the result. Now, the same effect is produced in the frog's bladder, which is contained in a very contracted state. It has actually proved that the imbibition takes place in the latter case into the blood-vessels, and that the salt is conveyed to the remotest parts of the body by the circulation, instead of having slowly trickled down through the tissues, as in the former instance, in the case of the dead animal. But further, not only does the movement of blood in the vessels promote the diffusion of liquid, which has been already observed, it also increases the rapidity of the absorption itself in a very extraordinary degree. Thus, if a membranous tube, such as an ink sac, or a piece 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 allowed to remain as above described, the effect of the chloric acid, it will be some time before the acid will penetrate to the interior of the tube, which is distended with water; but if the stop-cock be open, 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 obviously one of the most potent of all the conditions of absorption in animals, and will be confirmed by the press in 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 such circumstances which are laid down by physiological, as well as by medical, terms, as assuring absorption, are in strict accordance with the physical principles which have been now explained. These circumstances are—1. The ready miscibility of the liquids to be absorbed with the juices of the body. 2. The penetrability of the tissue 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 decisively to indicate that the relative facility with which different substances are absorbed, 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 each other. In this way, 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 Volkmann and others, which are laid down by pharmacological terms, as thus accounted for." ('Principles of Physiology.') [Absorption.]

ENDYMION, a genus of plants belonging to the class of Endogenes, the order Liliacea, and the tribe Hemerocallideae. It has a tubular bell-shaped perianth, composed of six convolute leaves, with reflexed points combined below the
stamens are inserted below the middle of the perianth; the filaments decurrent.

E. _mat»s, the English Blue-Bell. It is also the _Scilla_, the _Hyacinthus non-scriptus_, and _Agrilus matrona_ of various botanical writers. It has linear leaves, with nodding racemes, the flowers bell-shaped, cylindrical; the apex of the sepals revolute; the bracts 2. This is a very common plant, flowering in May in the woods and thickets of England. It is also common in France and Belgium. The flowers are about 1½ inches long. The leaves are shorter than the flower-stalk. The flowers are initially blue, a white variety is however occasionally seen.

ENFRANCHISEMENT. The enfranchisement of copyholders, to facilitate which a great many acts of parliament have been passed, is now, by the statute 15 & 16 Vict. c. 51, been rendered compulsory alike on the lord as on the tenant, on terms which are to be determined in case of difference by the Copyhold Commissioners nominated by the statutes. From the annual reports of these commissioners, which are laid before parliament, it would seem that the holders of copyhold property are gradually availing themselves of the facilities afforded by the statutes; so that in course of time the old tenure by copy of court-roll will become rare, and perhaps unknown. This is one of the many instances showing the tendency of modern legislature to simplify and cheapen the transfer of real property. (Blackstone’s ‘Commentaries,’ Mr. Kerr’s edition, vol. vii. p. 146.)

ENGRAILUS. [Anchoy.]

ENNISTYMOND. [Clare.]

ENTOPHYTA (from _entero_ and _physis_), a term applied to plants found living within animal bodies. The term _Entophyta_ has been applied to those forms of plants which live upon the exterior of organized multicellular plants or animals. It is however difficult to draw the line between these two classes, because it frequently happens that a plant whose spores are deposited in the interior of an animal body, in the course of time finds its way to the surface. The term Entophyte has also been employed to designate those higher forms of plants, more especially the _Orchisidae_ which are found growing on other plants, so that the term Entophyte is more especially used to designate those cryptogamic plants which grow on the skin or mucous membranes of animals. These will be more particularly referred to here. At the same time it should be observed that a large number of cryptogamic plants are found in the living tissues of other plants, and claim to be regarded as Entophytes in relation to the vegetable kingdom.

The study of Entophyta has been invested with considerable interest, since by the aid of the microscope so many of these plants have been detected accompanying various diseased conditions of the animal body. Although they have been perhaps more carefully investigated in the human body, it has been for a long time a familiar fact that many of the lower animals are attacked by these plants in states of disease. Thus the cultivators of the silk-worm have observed the growth of a species of _Botrytis_ in the organs of that animal, producing great destruction amongst them, and the occurrence of this fungus is known by the name of _Muscocline._ [Muscocidina, S. 2.] Caterpillars have been brought to this country from New Zealand, Australia, and China, as curiosities, from the bodies of which a species of _Cystaria_ or _Spharia_ of considerable size is found to project. A species of _Polistes_, a kind of wasp, has been observed in the West Indies to be subject to the attacks of a fungus which appeared on the surface of the body in the form of a growth as large as itself. The common house-fly is often seen in the autumn of the year adhering helplessly to a pane of window-glass from the growth of a fungus on its body, which has not been free from the suspicion of producing even so formidable a disease as cholera. Goldfish, when kept in confinement, as well as water-salamanders and sticklebacks, have been observed to be covered with a fungus (_Achlya prolifera_?) before death.

These facts, and many others, have from time to time attracted attention, which, having been followed up by diligent observations with the microscope, have led to the discovery of a very large class of vegetable bodies taking up their ordinary residence within or upon animal surfaces.

As to whether these plants are the natural products of the bodies on which they are found, as other plants are of the soil in which they grow, or are introduced from some foreign and extraneous source. From

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 disorderly state. In the same manner the ova of animals have been constantly present in the air and water, only waiting the proper combination of circumstances to be developed in prodigious numbers. The circumstances which predispose to the growth of these Entophyta upon the body, are not better known than those which predispose to the growth of certain contagious. 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, 1855). The following is a classification of these plants:

I. ALGI.

Class _Isozooceae_.

Sub-Class _I. Distomaes._

Genus _Pterospermium_, 11 species.

Sub-Class _II. Malacoceae._

Genus _Gymnospermium_.

Order _I. Hydrozoaem._

Sub-Order _I. Mycophyta._

Family _Cryptococcceae._

Genus _Cryptococcus, 2 species._

Genus _Palmellae._

Genus _Merimapsiopsis ventriculi._

Genus _Lepidophrya._

Genus _Lepisothrix, 2 species._

Genus _Cydodopryma comatum._

Genus _Arthromysis, 5 species._

Genus _Leptotonia._

Genus _Leptotimus, 6 species._

Genus _Houlinites, 3 species._

Genus _Laproplegnyctis._

Genus _Saproplegnyctis ferax._

Genus _Ehlerobryum, 4 species._

Genus _Ectina, 2 species._

Sub-Order _III. Tubibiria._

Family _Ocellarias._

Genus _Ocellaria._

Genus _Zygnum cruciatum._

Order _II. Cryptopneumia._

Family _Chotaphorae._

Genus _Chotaphora aerovecta._

II. FUNGI.

Division I. Arthroporae._

Tribe _Torulaceae._

Genus _Trichophyton, 3 species._

Genus _Microsporon, 3 species._

Genus _Sporodendron musae._

Tribe _Oidaceae._

Genus _Arhochon Schankerian._

Genus _Oidum, 3 species._

Tribe _Aspergillae._

Genus _Aspergillus, 8 species._

Division II. Trichosporae._

Tribe _Ozogaceae._

Genus _Dactylium cogenum._

Genus _Botrytis Basiana._

Tribe _Spororichiae._

Genus _Spororichium._

Tribe _Isaria._

Genus _Isaria, 12 species._

Division III. Cytosporae._

Tribe _Cotylorhizae._

Section _Ascoceae._

Genus _Muco Muco._

Division IV. Chirospora._

Tribe _Coniopsideae._

Sub-Division _Entodiver._

Section _Spheronomet._

Genus _Loboulbenia, 2 species._
Tribe Saropodidae.
Genus Silbium. Buguet, 1855.
Division V. Thecospermae.
Tribe Spharicae.
Genus Spharica. 8 species.
Genus Astrophyton, 2 species.

The following is a list of the distribution of the species of the above genera in the various localities of the animal body.

I. Man and the Mammalia.
A. The Skin.
Triphyllon tenurum. Malmsen. (On Hairs.)
T. sporuloida. Ch. Robin.
T. ulerum. Ch. Robin. (On Ulcerated Skin.)
Microsporon Audouini. Gruby. (Hair Follicles.)
M. notophytoton. Ch. Robin. (Roots of the Hair.)
M. furfur. Ch. Robin. (Skin.)
Mucor mucro. Linnena.
Adorion Schimelinitei. Remak. (The Hair and the Hair Follicles.)
Aegriptyl species. Facini et Meyer. (Auditory Passage.)
Puccinia faro. Arsten.
B. On the Mucous Membrane.
Cryptococcus cerevisiae. Kützing. (Intestines.)
C. guttulata. Ch. Robin. (Rabbit.)
Mesorhizospora variabilis. Ch. Robin.
Leptodriza buccalis. Ch. Robin.
Oculaire (5) of the Intestines. Farre.
Leptomitus urophilus. Mont. (Bladder.)
Leptomitus of Hannover. Ch. Robin. (Pharynx and Oesophagus.)
Leptomitus of the Epidermis.
Leptomitus of the Urethra.
Leptomitus of Uterine Mucus.
Leptomitus of the Eye.
Oidium albicans. Ch. Robin. (In Thrush.)
Fungus of the Lungs. Bennett.
Fungus of the Nasal Mucus.

II. Birds.
A. Of the Respiratory Organs.
Aspergillus candidus. Michele. (The Air-Cells and the Lungs.)
A. glaucus. Ch. Robin.
A. nigrescens. Ch. Robin.
A. strix nucis. J. Müller and Retzius,
Mouldiness of the Lungs of the Jackdaw. Meyer.
B. The Egg.
Dactylotus oogenum. Montague.
Sporotrichum (Nematogonum) brunneum. Schenk.

III. Reptiles.
A. The Eggs.
IV. Batrachians.
A. The Skin.
Saprolegnia ferax. Kützing.
B. The Gills and the Cellular Tissue.
V. Fishes.
A. The Skin.
Zygema cruciatum. Agardh.
Chetospora (Tremella) meteorica. Ehrenberg.
Saprolegnia ferax. Kützing.
Conversa of Gold-Fish. Bennett.
Algce of the Stickleback. Manicas.
B. The Gill and the Cellular Tissue.
Porosporina of the Pike. J. Müller.
P. of the Synodon Schol. J. Müller.
P. of the Sandre. (Lucioperca sandra.) J. Müller.
P. of the Roach. (Cyprinus rutulus.) J. Müller.
P. of the Labeo nitidus. J. Müller.
P. of the Pimelodus Blochii. J. Müller.
P. of the Pimelodus Semp, and of Platystomum fimbriatum. J. Müller.
P. of the Catostomus tuberculatus. J. Müller.
P. of the Acricrtus vulgaris of Grenville. Creplin.
P. of the Scina umbra. Ch. Robin.

VI. Insects.
A. On the Elytra, and on the Articulations.
L. ferruginea. Ch. Robin.
Silbium Bugueti. J. Müller and Ch. Robin.
B. On the Caterpillars and Chrysalides in the Tissues.
Genus Spharica. Haller.
Section Cordyceps. Fries.
Spharica militaris. Ehrenberg.
S. spharoechta. Klein.
S. atornodormis. Dickson.
S. nebulosa. Hill.
S. nebulosa. Hooker.

VII. The Myriopoda.
A. In the Intestines.
Enterobryya elegans. Leidy.
E. spiralis. Leidy.
E. proceria. Leidy.
E. Juli-termina. Ch. Robin.

VIII. The Mollusca.
A. On the Vesicle of Slugs. (Algae indeterminée. 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 Brytis 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. Entomophyta 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. Triphyllon tenurum (Malmsen); Triphyllon tenurum; Mycderma of the Pilos Polonici; fungus of the hairs in Herpa tomentosa, fungus of Porrigo scutulata, Acharium Leberti; fungus of the Tegne tomentes, Basil: Rhizophyte, Gruby. This fungus was discovered and described in 1844 by Gruby in the disease called by the brothers Marquise de Téisme to be the cause of the two plants were formerly described as different. The Triphyllon is formed by oval transparent spores, which give rise to articulated filaments. Its anatomical seat is in the interior of the roots of the hair. The hairs and fungi simultaneously increase. The former seem larger than usual, are paler in colour, lose their elas-

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tidely, soften, and break off when they have risen some one or two lines above the surface of the scalp. In the short cyathus, the fungus grows still more rapidly, so that the normal structure of the capillaries 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 form the little brown, or rather black, structure which the Trichophyton is the cause of the disease known under the various names above given, and each has given examples of the contagion of the disease by the transmission of the spores. The spores and mycelium of the plants can sometimes be seen, in the form of a white powder, on the roots of the hair or hairs.

The old term of 'Torquous' is still retained, as sometimes the disease disappears, that is, the fungus dies without disappearing. With respect to the name of the most common disease in which the Trichophyton tonsurans appears, the term used by Cassave (Hepras tonsor) is extremely unfortunate. No doubt vesicles are sometimes formed, and it is easy to say that the error of the specific name is a natural symptom of the disease, but it is well known that in the 'Barecdn' or true Herpes circinata of the scalp, in many cases there are no vesicles at all throughout the whole course of the disease. The term used in this country for scrofula is not inconvenient as it is applied with greater justice to Favus. The opinion is entertained that the specific name of the disease after all the facts, and the specific name of Favus tensus expresses well one feature of the disease, the baldness arising from the brittleness of the hairs.

2. Trichophyton (i) spumilis (Robin). Mycorrhiza of the hair. This species was described by Wallach in the Plecton Polonica or circular flattened spores, which have been too little studied at present to permit their exact characters to be stated.

3. Trichophyton (f) tserum (Robin). Lebert has described a fungus in the crusts covering an atomic nicker of the leg.

4. Microsporion Audouini (Gruby). This plant has been studied by Gruby, and its existence, though denied by Cassave, has been confirmed by Robin. It is present in the disease commonly called after William Porrigo decalcaris or Decalcaris (Rush). It differs from the Trichophyton of Tinea tonsurans, by its numerous waved filaments, and by the extremely small size of its spores. It is not found, like the Trichophyton, in the diseased scalp, and Puccinia (s) as well as Alopecia aerygena, the hair then becomes opaque, softens, and breaks off. The Alopecia is rapid, with or without williogia of the skin. The genus is well known, and the epidermis is thin and smooth. There is an affection which should probably be distinguished from the Porrigo decalcaris, or Alopecia circumscripta, and which is characterised by a rapid disappearance of pigment from both skin and hair, with or without Alopecia. M. Batin includes it in his Tinea achromatata, but does not mention the fact that Alopecia is not common. He states that a psoric acid 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 dermis. Besides, when the hairs return they are at first white, and only gradually regain colour; but if the williogia were owing to a plant, it is probable they would not grow at all. The disease appears to be allied to those obscure pigmenitary changes which have a much deeper seat than the surface of the body, such as seen by the Trichophyton. This is between the bulb of the hair and the follicle in which the bulb is seated, and never extends beyond the surface of the skin.

5. Microsporion forfar (Robin). In 1840 Eichsteadt discovered a cryptogamic plant in the disease called by William Pijlioniens enodicolor, and more lately Chloasma. Soon after—

wards Sleyter described the same fungus, and lately Spranger has described and figured it. It forms with the epidermis the yellowish-brown scar seen in Pijlioniens.

r. Achromatana Schonleinl; Mycorrhiza of Tinea favosa; Porrigo phlogist (Gruby). Favus of the Hair. Schonlein was the first to suggest that the honeycomb, or yellow favous crusts in the so-called Porrigo decalcaris (Wise), which often forms the inner root-sheath of the follicle. In this observation however he has been anticipated by Weil, who has pointed out that by using a concentrated solution of iron potassa to make the parts transparent, the fungus is found in the follicle round the hair at the place where it passes through the epidermis. In addition to this, the plant is found in depressions on the surface of the skin, forming the yellow honeycomb-like masses which give the specific name Favus to the disease, and which from their frequent thickly-like shape suggested the term scrofula.

The development of the disease as described by Robin after Remont and Lebert. A cuticular elevation is seen, beneath which is a small favus. When the cuticle is raised, a drop of pus sometimes issues; hence there is a purpuric crust, but with this disease always purpuric. Generally however there is no pus or liquid of any kind. The plant grows, and the cuticle over it (supposing it has not been forcibly detached) finally separates, leaving the favus exposed to the air.

M. Batin describes the favus under three heads, which are fundamentally identical, and different only in respect of form:—

1. Favus urcrellariae dissemnia: this corresponds to the Porrigo decalcaris, Tinea diaperina, and Tinea alveolata of other authors.

2. F. sefemina: this is the Porrigo scrofulata, or F. conoffitus.

3. F. aquamara, a form usually called scrofulata, but distinguished chiefly by the irregular distribution of the scrofula, and by the furrowed masses formed by the fungus, the hairs, epidermis, and exudation.

4. Puccinia Favi. The scrofula contains, with epilium and a little exudation, the mass of the Favus; but the Favus has been described, (1860) by M. dejeter, that a different fungus, a species of Puccinia, is occasionally also present. Robin considers it to be only an epiphenomenon, and that it is certainly not present in all cases. The species of this fungus (Favus) is described as a small round body, rounded, and composed of two cells of unequal size, a superior and an inferior. The other extremity is prolonged into a pointed stem or trunk.

There are still three other plants found upon the skin, which need merely be enumerated.

9. Muscor. In senile gangrene, an ill-described fungus, supposed to be the Muscor mucoides of Linnaeus, has been seen on the slopping mass.

10. Aspergilla. In the wax in the external meatus of the ear, Mayer many years ago described a fungus, and Paccini has lately made a similar observation—Lepomltius (e) of the epidermis. An Aspergillus has been seen by M. Oglier in the epidermis of an arm which was irrigated for a long time to keep down inflammation after a gunshot wound. No one else has noticed it. Not only Messers. Robin and Bazin, but Simon and others of the best dermatologists of Europe, have adopted the opinion that the plants are the actual causes of the diseases in which they are found. The contrary opinion is still in vogue in this country, on the grounds that fungi are generally the proofs and consequences of decay, but not its causes; that in the various forms of Tinea a special condition of the skin and hairs appears necessary for the growth of the plant; and that in Tinea favosa (Favus) in particular, a marked feature of the disease occasionally is an hyper-secretion of epithelium and exudation, owing to an hyperemic cutis, before any traces of fungus can be found.

Nevertheless, these arguments, strong as they are, seem to be overborne by the two grand facts that Tinea tonsurans and
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Tinetos fascos can be communicated by transfer of the plant, and be cured with the greatest readiness by the chemical agents which are most destructive to vegetable life. That a special nidos 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 denies the co-operating cause with the specific and peculiar poison.

It may be desirable to recapitulate the diseases of the skin in which parasitic plants are found:—
1. Tines toxaden, in which the Trichophyton ton."n.sawari.
2. Tines fascos, in which are present the Acchorion Schumanni, and the Puccinia Favi in some cases.
3. Mentagora, or Tinea mentagora, which exhibits the Bich's sign.
4. Phytopea versicolor (Ohiozoma), in which the Microsporon furfur occurs.
5. Porrocost decazana (Tinea aehromata), in which the Microsporon Audouin is found.
6. Pilise Polonese, in which the Trichophyton ton."n.sawari and Trichophyton sporidiae are present.

II. Entophyta on the Mucous Membrane.—The plants forming on mucous membranes, or in the contents of cavities lined by mucous membrane, are of less interest than those which affect the skin, in most cases, are the disease-causing only secondary. We shall merely enumerate them:—
1. Cryptococcus Cerevisiae, Kitting (Torula Cerevisiae), the Yeast-Plant in the bladder, stomach, intestines, &c.
2. Entophyta carotae, Robin (Sorina), in the stomach, intestines, &c.
3. Leptothria buccalis, Robin (Alga), of the mouth.
4. Occidaria of the intestines. (Farre.)
5. Leptophyta urinia, Montague; an Alga described as forming in the urine. It has as yet been scarcely studied.
6. Leptoposum (1), Hannover, Robin; Alga found by Hanover in the pharynx and esophagus.
7. Leptoposum of the uterus.
8. Leptoposum of the urinary mucus.
9. Leptoposum of the eye.
10. Oidium albozana, Robin (Cryptogama) of diptheritis and sputa; Aptophyta. (Gruby.)
11. Fungus of the lungs. (Bennett.)
12. Pharynx in the discharge of glangers.

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 dejecta of those affected with cholera, in 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 to introduce, with the food. It has been stated above that the spores of certain species of fungi are found naturally on grains of wheat, and only await favourable conditions for development. Such fungi may be constantly introduced into the stomach with the flour of wheat in the form of bread or other kinds of food.

In the study of the vegetable parasites of animals, particularly those of the intestinal canals, it is necessary to be careful not to confound the tissues of certain well-known cryptogamic plants, which may serve as food or adhere to the ordinary food of such animals, with the true Yeast Fungus, 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 yellow matter, but this appearance is more probably arose from the cells being distilled with a single large, transparent, colourless, amorphous globule, which pressed a small existing amount of protoplasm to each end of the cavities. The cells were single, or in rows, to eighteen in number. For the 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 of the spores, in the form of ellipsoidal bodies, were of a globular shape, very large, and one in length by the breadth of an inch in breadth. The rows measured up to the length of an inch in length. (Leidy.)

(Leidy, A Flora and Fauna within Animals; Robin, Historie Naturelle des Vegetaux Parasites; Baxin, Itinerarium sur la Nouvre de la France, &c.; Bich, S. Schumani, Th. Schumani, and Entophyta; Brittan and Budd, Journal of Microscopical Science, vol. ii.)

ENTRE RIOS, one of the River provinces of the Argentine Confederation, South America, owes its name to its situation, lying on both sides of the rivers Paraná and Uruguay; 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 runs along the Rio Guaraní, which separates the Paraná and the Mocoreta, which falls into the Uruguay, between 30° and 30° 30' S. lat. The area is about 30,000 square miles. The population is about 25,000.

The surface is gently undulating; it is only broken by hills along the middle portion or interior of the country. This part is covered with forests of low stunted trees. The southern part of the province is low, and especially along the banks of the Paraná subject to inundations. The northern part is occupied by a low swampy tract, known as the Forest of Mesopotamia, which is not navigable, and the whole 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. First frost is seldom fall before the middle of June and the year.

The highest range of the thermometer at the town of Paraná during the year 1844-47 was 96° in January 1844; the lowest, 90°, occurred in the month of June in 1844 and 1846. (M'Cann.) Cultivation is limited to a comparatively small extent. The crop of grain crops are wheat, barley, and maize. Tobacco and cotton of excellent quality are also raised, but the crops are precarious in consequence of frequent droughts. Great damage is also done to all kinds of crops by the locust and locoinds, and sometimes devastate an entire district. The principal grain crops are yacuma, millet, mazua, nandubay, black and white espinillo, gaebacho, and guayabio, but they are generally small, though in much request for carpenter's work and firewood. Vast herds of cattle are reared, but heavy losses frequently occur owing to the severe droughts to which the province is so often subject. In 1846 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 in the Interior to the southern provinces and the Hour of 4,000 to 60,000 head of cattle, and one farm 150,000. Horses are bred in great numbers. Owing to the long-continued state of anarchy in the province there are, in the unproductive districts, many slaves and criminals. The rearing of cattle and horses is the chief occupation of the inhabitants. Mechanical employments are almost entirely neglected. The geographical position of the province admirably adapts it for commercial pursuits; but owing to the closure of the navigation of the two great rivers, the 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, horns, tallow, and jerked beef.

The other provinces of the Argentine Confederation, Entre Rios is a federal 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. The only new arrivals by way of a few adventurers are mostly Italian, who mainly conduct the river trade, and are accompanied by 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.

Economic affairs of importance are the large wool-growing industry of Buenos Ayres, joining with Corrientes in the engage-

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all the subsequent proceedings which have had for their main object the opening of the rivers Paraná and Uruguay.

Paraná, or Villa del Paraná, the capital of the province, is built on the south bank of the great river. The distance is 3° S. lat., 60° 47' W. long., and contains about 6000 inhabitants. It is built on the summit of a lofty cliff, which slopes gently towards Santa Fé, which stands on the opposite side of the river. The original name of the town is Bajada de Santa Fé, or, the 'Descent,' and the only public building of any consequence in Paraná is the recently erected government house. A large church which was commenced some years back remains unfinished. The climate is mild and healthy, and the town possesses two fire-places and all classes live much in the open air. The supply of water is very bad; all that is consumed is brought to the town in carts drawn by oxen. The town at present has a quiet, listless appearance. Only a few small vessels belong to it. The exports are hides, raw cotton, hides, and fish. 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 rapidly in population. It has about 6000 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 SEC. of the province of Buenos Ayres. The name of the town is Concordia, of 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. Britann of Sheffield, and occupies 300 square leagues of land. Several other estancias belong to English subjects, and are situated on the Bahía Blanca, near the mouth 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.

EQUUS, a genus of Plants belonging to the natural order Polygonaceae. It has four thick and concave sepals connected together in a permanent uniovulate tube at the base, with three lobes at the tip. There is 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 stigmatic. The style long and filiform. The legume compressed, dry, coriaceous, 4-valved, 1- to 4-seeded. When young it is tomato-shaped.

F. digitata is a tree with abruptly pinnate leaves, bearing 2 or 3 pairs of ovate acuminate shining leaflets. The peduncle is pendulous on a long peduncle, concealingly composed of numerous distinct racemes. It is the Wallaba-Tree of Guayana according to Sir Robert Schomburgk, who informs us that its wood is deep red, frequently variegated with white, hard, heavy, and shining, and impregnated with an oily resin which renders it very durable. The bark is bitter, and is used by the Arawak Indians as an emetic.

EPISTILITE. [MINERALOGY, § 1.]
EPISILLENITE. [MINERALOGY, § 1.]
EPISILLENITE. [MINERALOGY, § 1.]
EQUINE. [HORSE.]
EQUITY. The proceedings of the Courts of Equity have been greatly simplified and cheapened by several recent statutes and decisions. The first of these was the Act of the Commissioners appointed to examine this subject in 1860. Instead of the writ of subpœna, 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 this event the plaintiff is not debarred 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 distinguo and sequestration if necessary. In the latter case another condition is that of proceeding by way of attachment and sequestration, he may enter an appearance for a defendant not appearing within eight days after the service, and thereupon 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 positively be a deceiver, 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, etc. Now in most cases such interrogatories were used much more sparingly, and 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 the great majority of cases the rule of procedure in chancery was adopted of transmitting 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 bill: but where the plaintiff requires an answer from any defendant or defendants 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, — except that the answer is no longer taken with the expensive formalities which used to accompany it. Formerly a declimus potestatem or commission was issued to take the answer and oath of a defendant in the country, which was sealed up, and either sought by one of the commissioners to the court, or sent by a messenger, 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 ordinary pleading, being affidavits, and not necessarily before any judge, court, notary public, consul, or vice-consul, 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 simple, and not of a complicated character, an answer is not now 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 upon interrogatories, even at the request of the parties. 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 affidavit. And if the parties give no such notice, requiring 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, and if no such notice is 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 conducted in the same manner, the party cross-examining laboured under the disadvantage of not knowing what the witness had deposed in 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 transmits the deposition 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 law, as distinguished from equity. The practice in equity, on the introduction of a cause of action, was 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. This must now itself determine 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 Court 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 Claim 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 far preferable. Claims are introduced in the form of Bills, with all 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. The claims are to be verified, or set aside upon motion; and any order of the Master 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.

Another 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 case makes: such an order has the effect made to have the force and effect of a decree of the like effect made on the hearing of a cause or claim between the same parties.

Any such order may also be filed, in order to obtain the opinion of the Court upon the decision of any question under Sir George Turner’s Act, 13 & 14 Vict. c. 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 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 practice a new kind of engine which he had invented, and which had hitherto been used, in Europe, in the production of hot steam, and therefore could not work without the dissipation 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, and presented an engine which worked 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 connected with a project for the generation of steam which was to supersede steam, 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. At the time the project was introduced, Ericsson was a citizen of Sweden; but on her 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 the ordinary engine, whichBursick approved of 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, 1853.

ERNITE. [Mineralogy, &c.]

ERLITE. [Mineralogy, &c.]

ERROL [Pertinaxes].

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 up the error of the decision to the courts of appeal by the Common Law Procedure Acts of 1855 and 1854. These statutes have abolished writs of error in civil suits, and substituted for them a simple notice or memorandum of the errors found, and appeal is made to the Court, of the appeal having been made. The statutes have likewise extended 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 may now give the judgment which ought to have been given by the Court below, and award all necessary process for giving effect to it.

ERYTHACA, a genus of Birds belonging to the family Syriniæ, the order Aves, having the following characters:—Beak rather broad and depressed; nostrils close to the base, coming almost in a downward direction to the point, slightly constricted; upper mandible deflected and notched. Notostilis basil, lateral, oval, pierced in a membrane partly hid by feathers and hairs projecting from the base of the beak. Wraps rounded; the three exterior quills graduated; the first only half as long as the secondary, 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 toes nearly equal to each other in length; the second the longest; the claw of the hind toe longer and stronger than the others.

E. rubecula, Sylvia rubecula, Motacilla rubecula, the Robin Red-Breast, Robin-Redstart, Robinette, Duddock, is so generally distributed over the European countries, divers other countries, where all are sufficiently interested in the bird 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 Robbins 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 but not very melodious, and Mr. White of Selborne says, 'The Robin sings all through the year. The reason that he is called an autumn songster is, because in the spring and summer his voice is lost in the general chorus, while in the autumn it becomes distinguishable.'

The Robin, one of the latest birds to retire to rest, 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 place frequently frequented by man.

Mr. Blackwall relates that a pair of Robins built their nest in a small saw-pit. Soon after the hen had begun to sit the sawing of timber was commenced at this pit, and though she was carried on every day close to the nest during the hatching of the eggs and rearing of the young birds, the old birds exhibited no signs of alarm or interruption. These birds exhibit great attachment to each
other, and many instances have been related to prove that they pair for life. With all his interesting qualities the Robin is not amorous; 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 sometimes with feathers; it is usually placed on a bank sheltered by bushwood, or a short distance above the ground in a thick bush or lane hedge, sometimes in a hole of a wall partly covered by ivy. The eggs are from five to seven in number, and of a white reddish-brown; the length nine lines and a half, by seven lines and a half in breadth. The bird is found all over England, Ireland, and Wales; it is also an inhabitant of the most northern counties of Scotland. It also visits Denmark and Sweden in the breeding season; and so well does it bear cold weather, that among the summer visitors to the latter country, the Robin is one of the first to come and the last to go.

It is a constant resident throughout the year in all the temperate and warmer parts of Europe, abundant in Spain and Italy, Sicily and Malta.

In the adult bird the beak and irides are black, upper part of the head, neck, back, upper tail-coverts, and tail-feathers, a yellowish olive-brown; tail-feathers rather darker, the outer ones with the edge of the secondaries tipped with buff, over the base of the beak, round the eye, the chin, the throat, and the upper part of the breast, reddish-orange; encircling this red is a narrow band of bluish-gray, which is broadest near the shoulders; lower part of the breast and belly white, the flanks 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 tail is slightly shorter, but the sharp points of her tail-feathers is very easily discernible.

The Red-Breast is subject to variation in the colouring of the plumage. White and partly white varieties are not uncommon. (Yarrell, British Birds; MacGillivray, Manual of British Birds.)

Erythr ... [In 1787.]

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 put to be 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 propensity, while neighbours used to 'patronise' the inconstant artist 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, when seventeen years of age, he left his master and obeyed the invitation of an uncle to come up to London.

His uncle, himself a skilful draughtsman, saw promise in the youth's crude efforts, and generously afforded him the means of practically solving the question whether his art was a calling or not. His patronage was an impulse merely, 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 found; by order of the academy being a plaster-cast shop, kept by Gianelli, near Sotheby.' Having thus sufficiently mastered the difficult
Ett. 220. Eun.

After this great success Etté resolved again to visit Italy, and though he be this time also carried with him a new love sorrow, he did not suffer himself again to return without seeing Rome. There, and at Venice, where he stayed seven months, he laboured with a diligence and copied with a rapidity and decision of execution, which astonished the dealers in his works, who sold his entire stock of pictures of being purchased by the President, and procured his election as Associate of the Royal Academy. "Strike while the iron is hot; you see what may be done by a little courage," was the advice now tendered by his old master, and Etté profited by that counsel. His works followed, some of large size and in the historical style, but mostly classic subjects of the order indicated above, and each succeeding one,—until he became careless or negligent under the pressure of competing patrons claiming ever and pictures from him,—contributing its share towards placing him in the position he ultimately obtained by general consent of the first English colourist of his day, and also by far the first English painter in his own peculiar walk of any day. The little pictures were one or two entirely spent in London and in his painting-room—the only breaks being an occasional visit to a friend in the country, a run to Edinburgh or to the Netherlands, and a brief stay on account of illness at York. His evenings he passed, during the winter months, laying aside the most invaluable works for the Royal Academy, where to the last he was one of the most regular and diligent among the students—it being his practice to paint studies in oil from the living model as shown them by his greatest masters, and to invariable Lemprière's Dictionary—ought to have his deficiencies 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 classical themes. All his works evince his own great and constant effort; but his mind had been trained as well 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 painting must be adjudged 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 a certain grace and beauty in his work of 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 surpassed.

Etté 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 seems to have thought (and his admirers have 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 either an insolent rake, or an object of ridicule, or one who knew anything of the painter. Few men in private life have given less occasion to the breath of scandal. He was scrupulously upright, sober, and pure. An artist whose confirmed proclivities were those of men; but it was not to be wondered at that the painter of works so opposed to the current notions of propriety should have had to bear with some hard judgments on the tendency of his works. He sought to vindicate himself and his intentions with his pen as well as his tongue, but while personally he needed no vindication, the only vindication his pencil can receive must be that which the works themselves furnish.


EUCHRIOTE. [MINERALOGY, S.1.]

EUGENINE. [CHEMISTRY, S.2.]

EULIMELLA, a genus of Molusca belonging to the family Pteriomidae, founded by E. Forbes, of a number of forms that had been previously referred to Eulima and Odostomia. The shell is elongated, and consists of many whorls, solid, smooth, and polished; the apex of the shell has a persistent embryonic spiral shell; the aperture subquadrate; periostracum smooth, thick, and yellow; and the muscle scar is the operculum corneous, pyriform. There are four British species. E. sella (Eulima crassula, Jeffrey), E. oculata (Melania oculata, Philippi), E. affinis (Eulima affinis, Philippi), E. clavata (Eulima clavata, E. fuscata (Eulima fuscata, E. clavata (Eulima clavata, Linn.)

EUNICE, a genus of Dorsibranchiate Annelida. It is furnished with tuft-like gills; the trunk is armed with three pairs of horny jaws; each of the feet has two cirri and a
bendle of bristles; two tenacula upon the head above the mouth, and two on the neck.

_Eupatorias_ is the largestANNELIDE known. It attains a length of from one to four feet, and inhabits the sea around the Antilles.

EUPATORIA, previously named _Kosloff_, a seaport town in the government of Taurida, on the west coast of the Crimea, is situated on the north shore of the Bay of Karalitsa, in about 45° 14' N. lat., 33° 25' E. long., 40 miles N.W. from Simpheropol the capital of the Crimea, and 45 miles from the port of Odessa. According to the census of 1851 it was 2,920, chiefly Tartars and Karakit Jews, with a few Greeks and Armenians. The port is shallow, admitting only vessels of about 8 feet draught, but tolerably safe and never frozen up. The bay forms an estuary. The trade is carried on by coasting vessels and ships 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 low dead walls. The principal buildings are a Russo-Greek church, several mosques, an Armenian church, two pretty synagogues, and a very fair wool factory.

The town is famous for the preparation of the black lambskin, known in England as 'A black' at a halfpenny a skin. The sheep are reared in villages and slaughtered in the vicinity. The skin is cured, brushed, and there are more than 100 manufacturers of this product. In 1841, there were 100,000 skins, and in 1842, 120,000, the value in 1842 being estimated at more than 100,000 rubles.

Eupatorias is the capital and chief town of the ancient _Eupatoria_, or _Eupatirion_, founded by Mithridates Eupator, and named after him. This town is now called Eupatoria, and there 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. It is possible that this town may have been the same as Eupatoria, but this is not certain.

Eupatoria was annexed to the Taurida Governorate in 1861. It has a population of about 12,000, of whom about 5,000 are Russian, 3,000 are Crimean Tatars, and 4,000 are Greeks. The town is connected by rail with Odessa and Simpheropol, and has a good harbor for small vessels. The chief products are hides, wool, and skins. The town is famous for its black lambskin, which is exported to Russia and other countries.

Evénement. [Mineralogy. 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 suitor; 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 these courts. The challenge of evidence, that is, the right of the parties to have such a discovery, by going through the expense and circuity 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 the rule of judicial approach and aid to the parties, to have such a discovery, by going through the expense and circuity 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 the rule of judicial approach and aid to the parties, to have such a discovery, by going through the expense and circuity of a Court of Equity, and therefore it was sometimes had by consent, even in the courts of law.
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. 42, s. 96, which has been already mentioned, and is only again referred to in the subsequent text. The effect of this act was to allow that, 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 question was prejudiced by his testimony, in the event of his being found 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 act 17 & 18 Vict. c. 83, which removed 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 14 & 15 Vict. c. 99, by the first section of which the proviso in the statute 6 & 7 Vict. c. 85 (which excluded all persons directly interested in the suit) was repealed. By the second section, the parties are made competent and capable of giving 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 capable of giving evidence against himself or any party or anyone who has given evidence tending to criminate himself, nor shall it in any criminal proceeding render any husband competent or capable to give evidence for or against his wife, or any wife competent or capable to give evidence for or against her husband. The proviso in the former provision of the statute that it shall not apply to any proceeding instituted in consequence of adultery, or to any action for breach of promise of marriage, was deleted, 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. 83, was passed, enacting that the husbands and wives of the parties to any suit, or of the persons on behalf of which any such proceeding is brought or defended, shall be excluded from testifying as witnesses, save only in any 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. (Blackast. 'Comm.' Mr. Kerr's ed. 30.)

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 directed attention to his services, in 1799, whilst under General Oudinot, commanded in the Netherlands, and captured the fortress of Loo. In 1800 he became aide-de-camp to General Brossier; but exchanged that for the same post under Murat. At the combat of Wurtingen, 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.

In 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, where he afterwards accompanied him 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. On his return, General Exelmans was arrested, with other officers, and sent to England, where he remained a prisoner until 1811. On his release he again joined his former general, who had ascended the throne of Naples. Soon after, in 1812, in Junot's corps, as second in command, he was several times with a general of division, September 8, 1812. Savary, in his 'Memoires," 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 present at many of the battles fought by Napoleon to defend the French territory. After the return from Elba, General Exelmans was called to the Chamber of Peers, June 3, 1816; and despatched to join the army of the north. He was not present at Waterloo, but took the command of the troops that were back in 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 18, 1816, and banished for life from France; but he reached, with honours, the bridge of Savres. He never spoke afterwards, and expired at two o'clock the next morning. (Rabbe; Savary, 'Memoires'; Bigot des Contemp.; Dictionnaire de Conversation.)

EXECHEQUER. [GREAT.] The Court of Exchequer in Scotland has been abolished by the statutes 19 & 20 Vict. c. 56; and its jurisdiction, under an amended procedure, transferred to the Court of Session. This court was instituted with the object, carefully concealed however, of introducing into use in Scotland the Common Law process peculiar to England, by means of the writ of quo minus. Had this been effected, the legal procedure in both countries would probably by this time have become entirely assimilated. The first conviction of a criminal in Scotland by a jury was, however, met by an assertion on the part of the Court of Session, of an authority to confine the jurisdiction of the former Court to matters of revenue, which being submitted to the writ of quo minus became useless for its intended object.

EXCRETIN. [CHEMISTRY, S. 2.] EXECUTION. [ATTACHMENT OF DUTIES, S. 2; DETINUS, S. 2; GOOM, S. 2; EXCISE, S. 2; EXCELSIORS, 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 character in the different countries, that—without entering upon the larger question of its immediate or remote 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 one country in which they took place. In England there had been the Exhibition of 1814, an exhibition of industrial art and industry resembling the well-known Paris exposition. The proposition for a great exhibition of national manufactures to be held at intervals of three or more years seems to have originated in 1845 with the Society of Arts, London, of which 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 society had gained more attention, and it was by the more alert 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, of which in March of that year an exhibition was established on the site of the south-western parliament 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 magnificient form, by throwing the exhibition open to the industry of the
The council adopted his suggestion, and measures were taken for enlisting in behalf of the scheme the sympathy of the Lord Mayor and of the Corporation, 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, the council consulted for time and again on the plan of the exhibition, and was at length resolved to carry the scheme, it was received with the utmost favour, 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 negotiations with a private firm, Messrs. Munday, who were engaged to deposit a sum of 20,000£ on the 30th of August, 1849, and to provide whatever additional money might be required between that time and three months after the final closing of the account of the subscription list. On the 12th of September 1851, the opening of the exhibition building was in the first instance estimated at 20,000£, but Mr. Cubitt on being consulted by Prince Albert named 60,000£, as a far more probable sum—so entirely at sea were the projectors of the scheme as to its extent and the amount of money required to carry it into effect.

Upon the suggestion of Prince Albert, application was made to the government for the appointment of a Royal Commission for managing an Exhibition of the Works of Industry of All Nations, and the ordinance was duly issued in January 1850 appointing such a Commission with Prince Albert as its president. At the first meeting of the Commission, the contract entered into with Messrs. Morrison, which had been home the building, was annulled, and eventually a sum of 51,000£ was awarded to the contractors as compensation for their probable loss. The Commissioners now appointed (January 24) a Building Committee, to whom was entrusted the entire arrangements for the building of this, the greatest part of which was completed by the 1st of January 1851, at which the city of Hyde Park, at which the hearty adhesion of various influential merchants and manufacturers was announced, and a general subscription was inaugurated with a view to raising funds for meeting eventual expenses. It was followed by corresponding meetings in every part of the country, and it was soon made evident that ample funds would be furnished. In fact a total of very nearly 80,000£ was ultimately reported to the Commissioners as subscribed, though only 67,600£ was paid into their banks—upwards of 11,000£ 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 undertaking, 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 50,000 square feet, and that it would contain the reception of goods by the 1st of January, 1851; that from day to day 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 on account of the difficulty of judging the nature of the undertaking. Of the designs sent in 18 were however singled out by the Commissioners for special commendation, and it was noticed as a curious circumstance that, though only 28 out of the competing architects were foreigners, of the 18 who were, all chosen only three were natives of the United Kingdom. However, though 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 for the building, which they laid before the Commissioners, a building was proposed which was to be 2300 feet long, 400 feet across, and to cover upwards of 20 acres. It was to be constructed of brick and lighted by sky-lights. In length it was divided into 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 300 feet in diameter, and of 200 feet high, with stonework of 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 prepared for being carried out with some degree of 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 constructed for the Duke of Devonshire 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 carry out his plan, and it was decided by the committee to proceed with it. Its singular adaptation to the purpose of the Exhibition 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 79,800£, the materials for the building remaining the property of the contractors.

From this time all proceeded rapidly and smoothly. The contract was signed on the 26th of July; on the 30th the contractors obtained possession of the site; on the 26th of September the building was almost ready to be begun; and on the 4th of December the first rib of the transept was raised; 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 complete building was 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, 408 feet, with an additional area of 718 feet on the north side, and 484 feet 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 73 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 72 feet and a height of 108. The entire area was 772,784 square feet, or about 19 acres—nearly seven times as much as St. Paul's. The windows were arranged in double pairs, and opened into a central nave, four side aisles, and several exhibitors' courts and avenues. There were 3 entrances, with 8 pay places to each, and 18 doors for exit. Four galleries ran lengthwise on either side of the building, and others around the transept; and access was given to them by 10 double staircases. The iron columns in the building, which, with their connecting pieces, were about 20 and 24 feet high respectively, were about 3300 in number; and there were 1074 base pieces beneath the columns, on which the whole structure rested. There were nearly 3500 girders, of three different lengths, 24, 48, and 72 feet, and of five different weights, 13, 13, 35, 130, and 160 cwt. Altogether there were about 4000 tons of iron built into the structure.

In the woodwork for the glass roof, the Paxton girders were 8 feet apart, with a ridge between every two. The squares of glass were 49 inches by 10. Besides the 17 square meters of glass (the freshest meters of glass court) there were about 1500 vertical glazed sashes. The ground floor and the galleries contained 1,000,000 square feet of flooring. Of sash bars there were 200 miles, and 30 miles of Paxton girders. The total woodwork in the building was estimated at 100,000 cubic feet. The form of the columns and girders was the same throughout, so 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 cubical compartments, each 24 feet square; each was left unlighted and then filled out as required. The commonest girders very ingeniously put together. Thus the entire ground-plan may be regarded as a series of these squares, the parallelism being 77 of them in length and 17 in width—total 1307 of them. The Paxton girders substituted to form the nave, courts, and transepts. The additional portion on the north side of the building was
30 of these squares long and 2 deep. The whole building, in fact, from the ground-plan to the ridges of the roof, was a repetition of the main regular format; and, in proportion, had the grandeur of a first thought, as most models of simple arithmetical calculation, and consequently from the hour when the contractors commenced their work, from the simplicity of the plan and the singularly small number of casting and other works, was practically a skeleton, each member of the whole framework of the edifice with the three principal colours, blue, red, and yellow, "in such relative proportions as to neutralise or destroy each other." Of course the announcement of his system was met with much depreciatory criticism, but the result amply justified his predictions. It was admitted that the colour added much to the general effect of the building, while it harmonised well with the contents. How admirably the building answered its purpose, what new and elegant combinations of form, light, and shade and colour, both the exterior and interior offered to the eye, or what a magnificent and surprising appearance it presented as a whole, whether regarded externally, or when, looking down its unrivalled vista, with its rich and varied contents, from lofty archways, pavements, roofs, and walks, as to the present under way, as to ever to be described. As is well known, the building has been re-erected at Sydenham as a permanent structure, with great improvements on the original aspect.

As soon as provision had been made for the building, the Commissioners turned their chief attention to the means necessary for obtaining its contents. The outline of an elaborate system of classification, drawn up by Dr. Lyon Playfair, was issued, showing what a wide range of articles was sought to be brought together under the title of "Objects of Industrial and Productive Art." The whole was arranged under four great sections: Raw Materials, Machinery, Manufactures, and these were divided and subdivided into a vast number of classes and sub-classes. To facilitate the collection of the objects, and to serve as ready means of intercourse between the producers and the commissioners, district committees were formed in all the principal towns and manufacturing localities, by whom all the arrangements respecting the allotment of space in the building and the transmission of the goods were conducted. Formal communications were made to the various foreign governments as well as to the governors of British colonies, by means of official despatches ordered to be conducted the operations in those countries required for their adequate representation in the great undertaking. And so judicious were these several arrangements, that though from almost every country of Europe—from the North American Union—from the republics of South America—from each of our own wide-spread colonies—from India, Egypt, Persia, and even from the Society Islands, specimens more or less bulky, valuable, and numerous were sent, the numbers comparatively few that reached their destination material late than the date at first fixed for their arrival. Considering the entire novelty of the whole proceeding, the immense difficulty there must have been in many instances experienced in getting the collections together, the little knowledge that a large proportion of the contributors could have had of the extreme importance of punctuality, as well as their comparative want of interest in the success of the scheme, and the various physical as well as conventional obstructions which had to be encountered, this must, we think, be regarded as by no means of the least remarkable circumstances connected with the successful issue of the whole.

Of the actual number of objects purchased and record was kept; and as often a large number of articles was included under a single entry, no close approximation was, perhaps, possible. The Jury Council, however, in their report to the Royal Commissioners, said that the duties of jurors had "admitted the very greatest number of articles; at least 50,000,000 articles;" but this, though it tells much for the zeal and industry of the jurors, does not do anything towards explaining how the units of the million were determined. Of the whole amount contained in the building, making all guesses were hazarded during the vicissitudes of the Exhibition; the Commissioners state in one of the appendices of their Report that, taking in each case the owner's estimate of the value of his possession, the gross value of the articles exhibited—the famous Koh-i-nor diamond being accepted as the record—was worth £1,581,000, or about £7,802,901. 11s. 4d. The total number of exhibitors was about 10,000.

The Exhibition was formally opened by her Majesty, on the 1st of May, 1851; it remained open 144 days, being the longest period of any public institution in London. The entire number of visitors paid to the Exhibition was 6,063,998, being a daily average of 42,111. 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 again rose to the number of the 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, 90,913; Friday, 40,313, Saturday, 53,061. The following are the principal contracts presented by the daily returns: Highest for all beverage, May 24th, 44,512; Lowest, July 19th, 9,327; Highest half-crown day, October 11th, 53,061; Lowest, September 6th, 15,672; Highest shilling day, October 7th, 109,915; Lowest, May 26th, 25,408.

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 therefore the percentages that have been arrived at, and bearing in mind the result arrived at the conclusion that the probable average of visits would be about three, and that consequently about two millions of persons visited the Exhibition. Further, an attempt was made to ascertain the approximate number of foreigners; a few of the lists furnished to the Home Office by the captains of all steamers plying between 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 aliens who entered England from the United States from the 1st of April and the 30th of September, 1851, was 58,427; a number very far below what the public imagination had supposed. During the same period in 1850 the number of aliens who landed in England was 15,514, so that 42,913 would seem to be the ultimate number that has to be supposed to have visited this country for the express purpose of seeing the Exhibition, though probably few of the remainder left these shores without visiting it. The largest number of visitors was from France, 37,575, then came Germany, 10,400, the United States, 5000, Belgium, 3700, Holland, 2900. 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 nearest approach to the truth. The number of arrivals in London from April to October, 1851 were 4,257,340, against 2,791,733 in 1850, a difference of 1,465,607. 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, 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 'Prie Medals,' and 829 'Commissions of Honour,' making a total of 5084 honorary distinctions of all kinds. If we take the exhibitors at the estimated number of 10,000, about one-third were deemed worthy of some kind of recognition. Of the total number, 4569 were taken by exhibitors belonging to the United Kingdom, 2819, 197 to foreign countries, including 126 of foreign guests occupied about two-fifths of the space, and

1. It may be interesting to compare these numbers with somewhat cor-
responding details for the 'Crystal Palace of 1851,' as given in the 'Report of the Commissioners for the Exhibition of 1851.'

2. The 'Third Report (1850) of the Commissioners for the Exhibition of 1851.'

3. The 'Palais de la Faire Americaine' of the 1853 World's Exhibition in Paris. The entire number of visitors was 8,560,000; of whom the "Falaise des Beaux Arts" of this number 40,000 were British subjects, and the free admission of women's passports free of charge. The total number of exhibitors was 30,985; of whom the remainder 16,585 were from the United States, and 1,070 from the British colonies.
took off three-fifths of the honours. The greatly-credited 'Council Medals' were awarded in the ratio of 79 to British and 87 to foreign exhibitors; the 'Prime Medals,' 1244 British and 1628 foreign; the 'Honourable Mentions,' 716 British and 1336 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, they considered that the foreigners gained more prizes than all the foreigners combined. In textile fabrics, in fine arts, and in miscellaneous manufactures, the foreign exhibitors took off the honours in the ratio of about three-fifths to two-fifths British. But in the section of raw materials for food and manufactures, the British must be left far behind, with many more coveted prizes, as many prizes as the British (368 to 268). It would be a hasty generalisation to infer from thence that Britain is a manufacturing and not a producing country; but the simple facts of the trade are worthy of note, whether we theorise 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 166, 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.

We shall confine our remarks to the 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 of one guinea for the unchaging of a ticket, no less than 10,393 gentlemen's tickets at three guineas each, and 6151 ladies' tickets at two guineas each, were sold before the Exhibition commenced, making together 19,507, for more than 52,000L. were paid. About 6000 more tickets were sold during the period of 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 door was on the second day after the opening; the largest was on the third day, the receipts being 1342L. and 1328L., respectively, the former in sovereigns and the latter in shillings. The average of the daily receipts at the doors was 2333L. There were two admission days at 1L., twenty-eight at 5L. thirty at 15L., eighty at 1L., one for season-tickets only, two for exhibitors and their friends, and one for exhibitors and the officials; making up the total, and a hundred and forty-four.

The total receipts amounted in round numbers to 500,000L., that amount being thus made up: subscriptions 67,000L., entrance tickets (i.e. receipts from railway and catalogue contracts, royalty on medals, washing-rooms, &c.) 13,000L. The total expenditure connected with the Exhibition was about 330,000L., leaving a surplus of 176,000L. in the hands of the Committee. The expenses of the exhibition, including interest on Exchequer Bills and additional small receipts was 186,430L. 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 conclusion 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 extend the influence of 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 planing the public mind in the minds of the classes 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 of technical and mechanical, and the means supplied to supply the deficiencies which they have pointed out. Properly to carry into execution any comprehensive scheme would require the liberal co-operation 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 should have become fully understood and appreciated. The "The Commissioners feel it their duty to deal with the funds in their hands in such a manner as may ensure the greatest amount of advantage being derived from the modes of their application; and that the public and its friends should be left in no manner could this be effected so well as by carefully preparing the basis and framework of a large and comprehensive plan, and securing facilities for its execution, leaving it to the various interests concerned to give substance to it, whilst the perfect development of the system must be left to the public as a whole, in union with the wants at present manifested, and extending it as those wants become greater and find expression on the part of the public. In investigating the causes which have led to the decay of English and of larger institutions of the character alluded to, and the reasons why the great amount of private exertion and of State endowment already mentioned has not operated with all the advantage that might have been looked for, we have found two, which have more especially attracted our notice: the first being the want of that harmony of system which would admit of an economic and combined action of the forces already in existence towards a common end; and the second, the want of actual space for their development in this overcrowded metropolis." And having pointed out the general lines of the scheme which appears to them that, "The two things to be aimed at are the adoption of a system and the securing of a locality where that system may be developed. We feel that we are best engaged in assisting in the first stage of the matter, in submitting for consideration and discussion on the part of the public such a system, by ourselves providing such a locality, bearing in mind that the filling up of the plan that may be adopted must be left to the wants expressed, to the public at large. The great object of our efforts should be the methods of the institutions, societies, and individuals, aided by the efforts of the Government to develop more fully the institutions already founded by it, and which are so much appreciated by the public."

Acting on the suggestions of this report, the Government in the speech from the Throne at the opening of the session of 1852-53 invited the "aid and co-operation of parliament in promoting a comprehensive scheme" for the advancement of the Fine Arts and of Practical Science, which they considered in effect the scheme of the Commissioners. After some discussion the House of Commons voted the sum of 150,000L. towards the purchase of a site on which a National Gallery and Museum might be erected, and which should be available for the purchase, the income of the site being provided by the Commissioners out of the surplus remaining at their disposal. The land purchased by the Commissioners consisted of the well-known Gore House estate of 21 acres, and the adjacent site of 2 acres, and of the Villars estate of 48 acres, and some other adjacent land, which "were deemed indispensable for the completeness and development of the capacities of the property." Altogether it formed a compact estate of about 56 acres, its extreme length being half a mile, its average width a quarter of a mile. The Commissioners were anxious to secure other adjoining property to the extent of about 80 acres then obtainable, making in all about 170 acres, but the Government demurred, and the opportunity was lost, it being feared that the building would be in the way of the completion of the purchases the government subsequently obtained an additional vote of 27,000L; and the Commissioners, having obtained the necessary powers from parliament, have formed upon the estates lines of road, sewers. The total expenditure upon the Kensington estate up to Jan. 31, 1858, has been 312,036L., and 54,716L. remains to be paid in completion of one of the purchases. The Commissioners wish to retain in their hands a balance of 20,000L., which they consider they may safely retain for the purpose of meeting current expenses and providing for contingencies. The Commission itself has been incorporated as a permanent body, and certain members of the Government have officiated as its officers.

The "comprehensive scheme" of the Commissioners proposed eventually to bring together, upon the locality they have purchased, all the existing metropolitan institutions, whether dependent on government or on private support, which have in view the advancement of science and art in
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 mechanical engineering industry and enterprize. But the Commissioners have been doomed to see their scheme, like so many another castle in cloudland, reduced to much humbler dimensions than that in which it at first presented itself to the spectators. As a first step it was proposed to remove the National Gallery, and a noble site with a frontage of 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 1853 reported unanimously in its favor, and the Government 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 Trafalgar Square; and in consequence of their report a survey has been made of the ground in the rear, 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 removal. So again, a new building has been erected for the collection of vegetable products at Kew, which were proposed to be taken to Kensington. Then the Learned Societies were averse to migrating so far westward, and provision has been made for their accommodation at the Westminster House, Piccadilly, which was purchased by the Government.

But a very definite advance has been made. By manufacturers and artizans, and by the general public, as well as by the Commission, the great importance of systematic art instruction is now generally admitted. A new department of the Government has been created, whose special duty is the promotion of Industrial Art and Science; and to which was intrusted the direction of all previously existing government scientific and art institutions, and the encouragement of all local institutions of a similar order. [Sciences and Art, Department of, S. 2.] 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 the mechanical arts is given to young boys. 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 Asylum of Science, in Jermyn Street—the two institutions making together a school nearly 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 cases 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 Manufacturers, a Museum of Animal Products, a Museum of Domestic Economy, the Architectural Museum forming part of the Great Exhibition, and paintings by British artists presented to the nation by Mr. Sheepehans, and collections of British sculptures, drawings, etchings, &c. At the present moment [March 1858], a collection of models and drawings submitted in competition for the Memorial to the deceased Commissioners is in some measure 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 Museum of Art and Industrial Science collected upon it.

EXILES. [See Exiles, Palaeis, &c. &c.]

EXOCETUS. [Fishing Fish.]

EYEBRIGHT. [Euphrasia.]

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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 refuge who came over to England after the revolution of the edict of Nantes. He was educated at the grammar-school of Hippleholme, near Halifax in Yorkshire, where he remained till 1799, when he entered at University College, Oxford. He took his degree of B.A. in 1792, and before he had reached his twelfth year, was elected a Fellow and Tutor of Lincoln College. He took his degree of B.A. in 1795, 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 'Horse 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-Tree, in the county of Durham, which he resigned in 1811; and in 1812 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 Sheberburn Hospital, near the city of Durham, which he was to hold when he came to 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 under his patronage, restored the chapels of his churches, and erected agricultural buildings on the farms. He died at his residence, Sheberburn Hospital, on the 27th of January, 1854.

The theological writings of Mr. Faber, particularly those on prophecy, have had a very wide circulation. One of the principles for the interpretation of prophecy which he chiefly employed to establish and exemplify was, that the delineations 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—Horse Mosaics, or a View of the Mosaical Horse—The Christian Prophecy, or a view of the Profane Antiquity, their internal credibility, and their connexion with Christianity, 2 vols. 8vo, 1801; A Dissertation on the Mysteries of the Cabiri, or the great gods of Phoenicia, Samothrace, Egypt, Troas, Greece, Italy, and Greece; 2 vols. 8vo, 1808; Dissertation on the Prophecies which has been fulfilled, are now fulfilling, or will hereafter be fulfilled, relative to the great Period of 1380 Years, 2 vols. 8vo, 1808; A General and Connected View of the Prophecies relating to the Conversion, Restoration, Union, and future Glory of Judah and Israel, 3 vols. 8vo, 1809; The Origin of pagan Idolatry, 3 vols. 8vo, 1816; A Treatise on the Genius and Object of the Patriarchal, the Levitical, and the Christian Revelation, 2 vols. 8vo, 1852; The Sacred Cause of Prophecy, or a Dissertation on the Prophecies which are to be the Grand Period of Seven Times, 3 vols. 8vo, 1858; Eight Disquisitions on certain connected Prophetic Passages of Holy Scriptures bearing more or less upon the Prophecies of the Messiah, 4 vols. 8vo, 1845.

FAIRFORD. [Glos.]

FALKINGHAM. [Lincolnshire.]

FAREWELL. [Hampshire.]

FARY, JOHN, civil engineer and draughtsman, was born at London on March 9th, 1791, and educated at Woburn, where his father was agent to the Duke of Bedford, who took much interest in the progress of agriculture. John Fary, senior, was frequently employed in making reports on geological questions; wrote a 'General View of the Agriculture, Cattle and Minerals of Derbyshire,' 4to (3 vols. 8vo, Lon-
well in the progress of his pupils as in their number and social position. His success as a teacher of course did much to spread the light of his discoveries and to increase the merits of his works effectively maintained. His course was one of steady prosperity, quite devoid of adventure. His time was constantly occupied either in teaching or painting, and he could only afford to reserve a little time to paint with the materials for new pictures. For many years Mr. Fielding held the office of President of the Society of Painters in Water-Colours, and his position was generally recognised as that of the head and representative of this branch of art; the more so, as he had done one little in consequence 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 accus-

Figtés. [Gallicole.] FĪLICES, or Filicae. A natural order of Plants, being the highest group of the class Cryptogamae, or Acro-
gena. The species are flowerless 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 surface, and produce unilocular, rarely
multilocular, cases containing reproductive spores.

The branchlets which bear the spores get little attention in
their study, and on modifications of which modern classifi-
cations depend, are the veins and organs of reproduction.
The veins are either simple or divided by a midrib, and from the
branch of development, or from one side of an eccentric or unilateral cost. The or-

The second kind of organ, the so-called ‘ovules,’ are
fewer in number and present different characters in different
stages. At first they appear as little round cavities in the
cellular tissue of the pro-embryo, lying near its centre, 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
or more of the spiral filaments make their way into the cavity,
coming 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
parts, which are arranged in an arcuate line, placed one
intercellularly standing down to the cavity below. These
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 converge and close up the orifice of the four
leaving down between them. Meanwhile the vesicular head
of one of the spiral filaments 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 importance of these phenomena, the author assumes the
analogy here to be with the process of fertilisation in flowering
plants. The pro-embryo is a structure formed of the upper
part of the embryo from the vegetal head of the spermatossora
from the end of the pollen tube into which it has penetrated
into the embryo-sac.

The transmission of these statements 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 Sumi-

"In the early part of 1849, Dr. Wigand 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 the
author’s. He says that all the filaments which are seen in the
organs, and he never observed the entrance of the spiral fil-
ments into the cavity of the so-called ovule. About the

argued that the existence of these cellular organs, producing
spiral filaments, the so-called spermatossoras, upon the ger-
mination of the spores, and their development into 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 speculations on the subject, just as it was beginning to fall into disfavour. Count Suminski’s paper gives a minute history of the course of development of the Ferns, from the germination of the spore to the produc-
tion of the regular fronds; and he found this development to exist in the following manner. The cellular

The cellular organs seen by Nāgeli were shown to be of two
perfectly distinct kinds, and moreover to present characters
which gave great plausibility to the hypothesis that they
represented reproductive organs; moreover, this author ex-
pressed the conviction that they had obtained a decided
value by observing an actual process of fertilisation to take place
in the so-called ovules, through the agency of the spiral
filaments or spermatossoras. The main points of his paper
may be briefly summed up as follows.—The fern-spores first
produce a filaments process, in the end of which cell-
development goes on until it is converted into a Marchantia-
like frond of small size and exceedingly delicate texture, pos-
sewing hair-like radicles threads on its under side. On this
under side is seen the so-called antheridia, which contain
cellular organs of two distinct kinds. The first, which he
terms antheridia, are the more numerous, and consist of some
what globular cells seated on and arising from single cells of
the cellular Marchantia-like frond. The ground of the
deciduous antheridia, contains millions of small spermatossora, in each of which is developed a spiral frond, coiled up in
the interior. At a certain epoch the globular cell bursts, and dis-
charges the vasicles, and the spiral framents moving within
the vessels, at length make their way out of the fronds 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 vessel, and to be furnished with six
spiral filaments or spermatossoras. The locomotion of these cells, in each of which is developed a spiral frond, is

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same time M. Thuillier published a series of observations on the Flora of Ferns. In these he merely confirmed and corrected the statements of Suminski, respecting the antheridia, and did not notice the so-called ovules.

Towards the close of the same year Hofmeister confirmed part of Suminski's statements, and opposed others. He stated that he had observed distinctly the production of the young plant (or rather the terminal bud for the new axis) 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 as the germ, or embryonal vesicle (the embryo 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, the separation of the conjuntive 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 almost identical. He found the young terminal bud to be 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 ovule being filled with the products of the filaments. 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 begins to be formed with the first filament, appears 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 transparent mass of homogeneous matter, containing the filaments, granules, and here and there large corpuscles, are embedded. It reaches down to the globular cell, or embryonal sac, and is in contact with it. This mass either fills the canal or diminishes in diameter from the blind end of the canal down to the embryonal sac. In other cases it possesses the form represented by Suminski, having a clavate 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 ovule under the microscope, and then a thin transparent membrane-like layer is seen, sometimes observed on its surface. In other cases the contents consisted of nucleated vesicles, which emerged separately or connected together.

The embryonal sac contains a globular cell, or embryonal vesicle, in the canal, the development of the embryonal sac constituting the division of this into 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 filaments are first observed as separate, 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 Suminski, 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 differs 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 especial mention, except in reference to the vesicular end of the spiral filament, which he regards as the remnant of the parent vesicle, from which the filament had not become quite free. The observations referring to the so-called ovule, and the supposed process of impregnation, are interesting in their theoretical bearing on the problem of development.

1. The spiral filaments swarm round the ovule in numbers, frequently returning to one and the same organ.

2. They can penetrate into ovules. This was seen only three times, but over a course of a whole year, and under different circumstances; twice in spiral filaments, which, not seen to enter a still widely open young ovule, then come to a state of rest, and after some time assume the appearance of a shapeless mass of mucilage; the third case of penetration occurred in small deeply opened ovules, and was seen to enter these filaments, like 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 existence of an organisation.

3. In the tabular portion of the ovule, almost in every case, peculiar club-shaped granular mucilaginous filaments occur at a certain distance from these filaments, like the spiral filaments, acquiring a brown colour with iodine. These mucilaginous bodies sometimes exhibit a twisted aspect, and the opaque nucleus, or a membranous layer, peculiarities which seem to indicate existence of an organisation.

4. The club-shaped filaments are seen seated at the lower capitate extremity, and have been found in contact with the embryonal 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 club filiform masses in the interior of the ovule are filiform masses, like the spiral filaments, which, not seen to enter a still widely open young ovule, then come to a state of rest, and after some time assume the appearance of a shapeless mass of mucilage; the third case of penetration occurred in small deeply opened ovules, and was seen to enter these filaments, like the spiral filaments, acquiring a brown colour with iodine. These mucilaginous bodies sometimes exhibit a twisted aspect, and the opaque nucleus, or a membranous layer, peculiarities which seem to indicate existence of an organisation.

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 individual plants. In the case of this fern the author is on the subject, with the exception of Wigand, the first frond, with its bud and root, an Embryo, and regard it as a new individual; or at all events, even a distinct member of a series of forms, constituting collectively the representative of the species.

Finally, Hofmeister, in his notice of this essay in the Flora, declares that the development of the so-called embryo, or first frond, commences not by the subdivision of the globular cell, or embryonal sac, but by the development of the embryonal sac in the division of this into two, which go on dividing to produce the cellular structure of the first frond.

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 Cycadaceae, with which order they agree in their gyrate vernation 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 Landly regards as the rank and value of orders:

I. GLEICHENIACEAE. The thymus with a transverse or obliquely transverse complete elastic anulus or ring, bursting vertically. The thymus is non-nitrophic only in the Southern Hemisphere, of a harsh and rigid texture, simple or generally with copious dichotomous branches and gemmae in the axils; the ultimate branches pinnaed. None of the genera of this order, as understood by Hooker, are British. The species are about forty species, distributed generally incomplete ring, bursting transversely and irregularly.

II. POLYPodiaceae, 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, or the sori grouped together; the veins of the leaflets are generally fine. They are extensively distributed, being natives of the American Continent, southern Europe, and parts of Asia. The species number about six hundred.
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 these, some are extensive, and have no British representatives, as Cyathae, Hemidactyl, Allophila, Dicksonia, &c.

III. Osmundaceae has the thecæ with an operculiform ring, or without one, reticulated, striated with rays at the apex, bearing long-hairs, and usually externally. The species of this sub-order are not numerous.

IV. Danacæae. The thecæ sessile, without any ring, concrete into multilocular sub-immersed masses, opening at the apex. This is also a small sub-order, with three genera — Dermagic, Kellwingia, and Ceratopteris.

V. Ophioglossacæae. The thecæ single, roundish, coriaceous, opaque, without ring or cellular reticulation, half 2-valved, with a straight vernation. It embraces the genera Ophioglossum, Selaginella, and Botrychium.

The following is an arrangement of the British genera of Fungi —

Sub-Order Polyposidae.
Tribe Polyposidæ. The sori nearly circular, without an indusium.
Genera. Allosorus, Polyposidium, Woodia.
Tribe Aspidiæa. The sori nearly circular, covered by an indusium.
Genera. Allosorus, Polyposidium, Woodia.
Tribe Aspleniææ, Polyplacotheca, Cytopteris.
Tribe Asplenidæae. The sori oblunget or linear, covered by an indusium opening longitudinally on one side.
Genera. Althrym, Asplenum, Selaginella.
Tribe Aspleniææ. The sori elongate, without an indusium.
Genus. Asplenium, Tectaria.
Tribe Adiantariae. The theciæ covered by a marginal or sub-marginal elongated part of the frond, or by a separated portion of the cuticle, resembling an indusium.
Genera. Blechnum, Pteris, Adiantum.
Tribe Hymenophyllæae. The theciæ opening irregularly; the ring oblique, eccentric, transverse, complete; the receptacle terminating a vein at the margin of the frond.
Genera. Trichomanes, Hymenophyllum.
Sub-Order Osmundaceæae.
Tribe Osmundææ. The vernation circinate; the rachis solid; the thecæ stalked.
Genus. Osmunda.
Sub-Order Ophioglossaceæae.
Genera. Ophioglossum, Botrychium.
The Ferns have a wide geographical distribution, the herbaceous and shrubby kinds 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 country where they grow, as their foliage and stems differ altogether from any that are observed among the flowering 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 25 to 125; in New Ireland as 13 to 60; in the Sandwich Islands as 42 to 160; on continents they are less numerous; in equatorial 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 297; in Egypt 1 to 971. In the north their proportions are greater. In India and the Sandwich Islands 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 Nephrodium excentrum are eaten in Nepal; those of Angiopteris evecta are used in the same manner in the Sandwich Islands. Diplazium excentrum, Cyathea medullata, Petasus excentra, and Gleichenia dichoto-
toma, all yield starch, and are employed as food in different countries. The Adiantum Capillia Veneris yields astringent and aromatic secretions. Some of the American polypondiums are said to possess medicinal effects, and are used as anti-rheumatic, anti-venerial, and febrifugal remedies. The Angiopteris evecta yields an aromatic oil, which is used in the Sandwich Islands to perfume the fixed oils, as coca-

The stem in 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 use in the manufacture of hats. (Babington, Manual of British Botany; Lindley, Natural System; Hooker, Species Filicium; J. Smith, The Genera of Fungi; Journal of Botany, vol. iv.; Newman, History of British Fungi; Burnett, Outlines of Botany; Mordan, Plan-

FILLANS, JAMES, sculptor, was born at Wiltoncourt, Lanarkshire, on the 27th of March, 1808. His father having become reduced in circumstances, removed into Renfrewshire while James was yet a child, and the boy was early set to the drudgery of cartage. In time of this, he became apprenticed to a weaver at Paisley; but disliking the occupation, was at the end of a year placed with a stone-

At this business, after having served his appre-

He, during his spare hours, even when engaged as a weaver, been teaching himself to draw and to make clay models, and by perseverance he attained sufficient skill to win some local celebrity. Motherwell, the poet, was at this time the editor of the 'Paisley Advertiser,' and he warmly encouraged the young man's tastes, and judiciously guided his aspirations. Fillans found in Paisley, at his moderate prices, patrons for small portraits, busts, and fancy figures; but he determined to go to Edinburgh and Glasgow for the great. In order to avail himself 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 a further study. On his return in 1836 he established himself in London, where he found many warm Scotch friends, among others Allan Cunningham, who sat to him for his bust, and introduced him to Chantrey.

At the exhibition of the Royal Academy in 1837, Fillans had seven busts, including one of Allan Cunningham, which attracted some attention. He now produced a Tam o' Shanter jug; 'The Birth of Burns,' an alto-relievo, and other designs of a similar kind, forming a Burns' series, which have been much submitted and praised; and he received a commission for a bust of Mr. Oswald of Auchinure, 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 not neglectful of other subjects. His chief work of this order was a life-sized 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 also produced about this period. He established his fame were his colossal statue of 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. His most successful portraits were received with enthusiasm, and the sculptor was congratulated with two or three public dinners given in his honour. Still, though so far successful, he found his income insufficient to maintain establishments in London and Glasgow, and he res-

To Queen victoria the commissions having being chiefly derived from his countrymen. He returned to Glas-
gow in 1851, but his health, already impaired, became gradually worse; and at length an attack of rheumatism overpowered him. While at the Clyde in 1854, he was attached to Mr. Reid in Glasgow, but 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 by no means equal success. He was apprenticed to Mr. Miton, an engraver of shop-bills, coats of arms, &c., but by devoting his leisure to the study

FRANCE [APPEAL AND TAXATION, S.2.]
FINDEN, WILLIAM, line engraver, was born in 1757. He was apprenticed to Mr. Miton, an engraver of shop-bills, coats of arms, &c., but by devoting his leisure to the study
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 books and 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 sedateness in his manner of adopting the most pesky and prolix occupations of his day, and in course of time to be one of the most popular engravers of the day; 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 £50. It was a very difficult, to remove the nature of the fundamental organ from which they had been produced. This latter has been termed Retrogeneric 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 sepals 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, its progress depends entirely upon favourable 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: the sepals, which are termed the Calyx (Phylla); the petals, which are termed the Sepals; the filaments, which are termed the Stigmas; the anther, which is termed the Filament (Filamentum).

The flower of Phanerogamic 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 the ovules, as the receptacles of the seed—while the stamens and the ovules, which are termed Carpels or Carpilla, are in the stamens the lower thread-like portion, which is termed the Filament (Filamentum), is distinguished from the upper thick and hollow part, containing the Dust (Pollen), called the Anther (Anthera). In the pistil, the lower part surrounding the Ovules or Seed-Buds (Spermillum) is called the Germen; the upper free part, which is usually covered with papillae, is termed the Stigma, and between these two frequently a stalk-like elongation of the germen occurs, called the Style.

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b. The Spermophore.

b. The Seed-Boards.

The Ants have been called the male organs of a plant (with the superfluous collective term Androecium); the Seed-Boards and their receptacle the Pistil, the female parts (together the Gynoecium). A flower that contains both parts is termed Hermaphrodite (the Binandric, bithecous). Flowers that contain on one or more of those kinds of organs are termed Unisexual Flowers (Flores Unisexualis, Diclini). When, in the last case, male and female flowers (mas et femina) appear on the same individual plant, such plant is termed Monoeious (the Plurianthemid, Sonchus, Diclini). When individuals the plant is termed Dichores (Planta Dioica).

An Inflorescence which contains both male and female flowers, also is termed Inflorescentia Androgynea. Here again it must be distinguished whether the male and female blossoms appear on the same or on separate (or sometimes, more commonly) different parts of the same plant (Dichlina); or whether, through the suppression of one or other part, a pseudo-dichotomous condition appears in a flower formed on the plan of a hermaphrodite. This latter condition, which is never found to exist, though all the examples of any species of plant, brings monocious and distinct species into hermaphrodite genera, and suggested to Linneaus the establishment of his 32nd class, Polygynia, where in one and the same species male, female, 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 androecium is possible within the flower; and the extremity of the pedicel immediately supports the floral parts. An example of this case in Euphorbiaceae, Euphorbia, 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 certain male flowers of Tussa, where the small pedicle, 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 unions may take place either between the parts and the axis (Antherophyta), or between the parts in the flower or between the stamens and the gynoecium (Gynomorph). The latter is generally termed German Stipitatum. There are examples of both in the Passifloraceae and the Capparidaceae.

A considerably longer part, without elongation of the individual stamens, frequently occurs as a gynophore in flowers which contain many gynoecia (as in the Rosaceae, the Ranunculaceae, Magnolliaceae, &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 gynoecium upon a base turned upward, as in Neotibium. 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 gynoecium; 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 many other cases, within the division of the corolla, the corolla develops obliquely, and rises up on one side, especially beneath the gynoecium, so as to appear as a part of its side-wall; this happens most with the Grasseae. A similar circumstance, arising from a similar cause, happens when many single gynoecia are present in one flower, by the division of the torus, which forms the basis of each of those gynoecia, and thus assumes the appearance of forming a part of the whole gynoecium (as in Psamomogen and Dryasaceae).

But the stamens in the Disc, or in a hollow cup, is far more frequent in the flower. If the collective indecides of the flower form a hollow body, or even a cylindrical elongated tube, which incloses only seed-buds, and has upon it all the floral parts upon its upper end, all this is the so-called Inferior Germen or Ovary (German Inferen).
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 monomorphic floral envelope (Bracteole); or that several foliar organs grow together by their edges: this commonly affects all the edges of the floral leaves, but sometimes two or three leaves are united, as with the calyx of Gentiana 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 of Nicotiana, the lateral edges of the calix and corolla of Triticum and the floral ligulata of the Compositae; or b, with each pair of leaf-edges at the side of the leaf-circle, whereby the two- or the four-edged (partes bilabiate) of descriptive botany arise. Another kind of blending also occurs in the calyx leaves but in which the young monads only and only one in the bracts and bracteoles, namely, the cupula of the Calyptrum; this is, the blending together of two more circles, as in the two circles of the floral envelopes of melaleuca, or in these and the two circles, stamens, in the circle of petals and stamens, in the Lobelia, &c.; and in general in all flowers to which are ascribed stamens perianthio vel corolla (not calyx) inseri.

The coherence of the stamens of one or more circles has become more perfect during the progress of the flower, and, according to the number of brotherhoods in a flower, Monadelphia, Diadelphia, Polyadelphia. When the foliar organs of the flower are coherent, the blended part is termed the Tube (Tubus Perianthii, Calycis, Corollae, &c.); the free part is termed the Throat (Ovarii, Throat of the Flower) (Tubus). 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 farther; so that the foliar organs of Chamaedorea, Cassavina, and in the androphore of Symphymena montanum (1).

Abortion in the flower means that some part present in the receptacle, whether the flower is perfect in the growing condition, or if it becomes disengaged from the perianth and gradually perfecting of the flower, and thus at last retires from 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, organs of the flower), and in the redimentary condition always regular. Through subsequent unequal development of the single parts, the flower frequently becomes unsymmetrically, or, as it is called, irregular. This irregularity is always such that the upper part of a flower becomes larger and better developed than the same part of the under part; very rarely the cloud of flowers, or of leaves, is such that the upper part of a flower is smaller than the same part of the lower part so that the flower is asymmetrical. In the case of the axis, organs of the flower, the accident of some parts, especially the calyx, remaining even regular even in unsymmetrical flowers; yet there are cases in which this is the only symmetrical part, as in the calyx of the garden plant, or of the corolla of Exanthes spiralis. If the unsymmetrical flower, with or without coherence of its parts, is divided into two halves, an upper and under, developed in different ways, they are generally termed bilabiata; but if only one single foliar organ is developed in an aberrant form, that leaf acquires the name of Labellum, or Lip. Rare indeed are the cases where the entire flower is unsymmetrical, as in Goodyera discolor.

It is not possible to state in general terms the number of parts which may unite to form a flower. We find of foliar organs alone sometimes as few as six or eight united in one flower. Certain combinations, on the contrary, are rarely met with: no monomorphic flower possesses double floral envelopes. When the various parts of the flower are present in the same number as the petals, and if the flower remains undivided, in two circles (Whorls) at the same height on the axis, and at the same time. When circles containing members of equal number follow in succession, the members of the one circle usually stand opposite the interspaces between the members of the preceding circle (the circles and their members being thus they seldom stand precisely before them (the circles and their members opposite). But it by no means is to be assumed that the members of each circle are always of equal number in a flower. The number of members increases as the flower advances, that is, as the flower ages; and the rate for the circle of the carpel to contain the greatest number, as in the Malope and Malvaceae. The regularity of monocotyledonous plants with perfect individual flowers has regular homogeneous flowers, and the flowers of the monocotyledons plants this is relatively rarer; the outermost and innermost circles have usually fewer members. Again, respecting the number of circles which follow one another, no general state-
Orchis, Delphinium, Pomaria, &c. 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 on the sepals (1). This expanded surface is termed the limb or blade of the leaf (lamina); the narrowed base is not termed petiole but claw (unguic). The true articulation is frequent between the foliar envelopes and the tube, but it never occurs in the continuity of these leaves (1); therefore there are no true compound petiolate leaves, though a simply divided limb is frequent, as the petals palmitatia in Rosella, the sepals of Helonias, and the true articulate sepals in Ophrys. The indication of true articulation may probably be afforded in the separation of the upper part of the tube of the flower in Mirabilis, of the calyx of the Datura from the lower, and in some similar cases.

The tubes are not met with in the floral envelopes, but appendages analogous to the ligula appear, which indeed is 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 various fashions 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 recognised as corona and accessory corolla (paraphyses) are composed of these elongated forms exhibited in the Scopolieae and the Passifloraceae; so also does a portion of the so-called nectaria, as, for example, in the petals of Ranunculus. All these are more or less dependent appendages of the foliar organs, which are developed from the flat, adjacent or opposite organs being produced from them subsequently. Here also occurs the one-sided development of a foliar organ; this is seen frequently in the petals of the Apocynaceae (Vinc, Nerium, and Cercis).

The collective form of one or more circles, whether conical or flat, is more accurately designated according to further peculiarities, as tubular (tabulose), bell-shaped (campanulatum), funnel-shaped (infundibuliforme), saucer-shaped (hypocotyliforme), rotata (rotatum), &c. When the circle is divided, one or more segments may be distinguished.

When all the foliar organs are similarly or nearly similarly developed in a circle of 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 simple petals.

Then if the circle segments, or in other words, if they are distinguished as the so-called epicalyx, the leaves must be distinguished also as the perianth phylla. When between the simple or manifold floral envelopes and the stamens other independent foliar organs occur which exhibit a structure very imperfect and abnormal compared with the floral envelopes, these are termed the corolla, of which it will be necessary 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 characterised:

1. The individual foliar organs are always expanded in a flattened or cylindrical limb and claw, and, at least when they are not coherent, united at the base. They may be green, as in the male flower of Urticaea, or of various colours, as in Thymelaeaceae; they may be firm and solid, and that especially when green, as in Eriogonum. They may be delicate, as in Arctostaphylos; or they may be developed as delicate scale-like leaves (palmis), or bristles and hair, as in the Typhaceae and Cyperaceae. The perianth is almost universally regular, rarely in some Ranunculaceae and Orchidaceae symmetrical; in these cases never (1) perfect, 5-merous or 2-merous. This is then not infrequently developed, hollow (sacculatum in Aconitum, calcaratum in Orchidaceae), and it is commonly the uppermost leaf of the perianth. Its foliaceous portions may be continued into the tube of the flower, as in Paeonia, Helenium, &c.; or in the tube of Ophrys, Urticaea; or of more, as Lilium. The parts are frequently blended with the stamens; in the corollin perianth the tube is sometimes straight, as in Narcissus; sometimes curved, as in Aristolochia. The mouth is mostly notched.

2. Sometimes, but seldom, as in the case in Narcissus, furnished with appendages which form a corona, which however are rare in the perianth, and in free foliages only (1) occur on the lip; the inner circle often bears a beard.

The structure of Periannthial 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; the separation into an upper and undervenecharma layer is seldom exhibited; but the epidermis usually. In the coloured and delicate parts of the cells of the parenchyma contain colouring matter. In general the parenchyma is very loose and almost spongy, and is very thin, and the cuticular tissue is very thin, and the cellular cavities filled with air; hence the white colour. The epidermis is less developed in coloured leaves, and more resembles the structure of epithelium; stromes are sometimes present, especially upon the under surface, but the epidermal cells of the upper surface are often reduced to shorter or longer papilles, which give the upper surface a peculiar velvet-like appearance. It is very frequent here to find the secrerated layer of the epidermis (cuticula) regularly and delicately striated (incrustulata) 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 tint.

Occasionally, especially at the base of hollow parts, no matter in what peculiarities of structure the plant may assume 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 Frutiliaria, very various parts on the labellum of the Orchidaceae, &c. Rarely, there is an interpenetration of many thickened porous parenchymatous cells, as in the species of Banksia and Dryandra (1). In paleaceous perians the spiral and other vessels are not so found in the usually simple vascular bundles, and in hair-like papilles 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 outer, or sometimes both, of the two sets of leaves; it has forms very much resembles those of the perianth; perhaps it is not so frequently delicate in structure and colour, as in the Scirpobaccaeae, Musaceae, Batomospermum, Ranunculaceae, Podostemata, &c. Usually it consists of one circle of sepals, more rarely of two (as in the Liliaceae). In each of these circles there 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 oblongi); sometimes they appear by means of a disc of scales, or as tufts of hair (the pappus of the Compositae). Appropriately the sepals are frequently of a sort made for concave form. The number of the sepals in each circle is in Monotocodylidae, frequently three, more rarelly four or two; in the Dicotyledons it is either one or two; in the Monocotyledons it is often three or sometimes more. Coherence of the sepals with one another may occur in every way, but never with the corolla and stamens nor with the germens; that is 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.

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 is only what exists in the inner set of floral envelopes accompanying a calyx, may be compared to a very delicate and coloured 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 Monocotyledons it presents in general only simple, round, oval, or lanceolate leaves, very seldom having claws. In the Dicotyledons the forms are infinite, as are also the variety and splendid of the colour. The following are the main points in the structure of the calyx:

1. The individual petal exhibits, on a reduced scale and in a delicate condition, almost every variety of form of the leaf, with the exception of the truly compound. Convex forms are here frequent, such as the hood-shaped, pitted-shaped, or spathulate-shaped; these latter, in free petals of an otherwise regular corolla, as in Fumaria. 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 ligule, and every imaginable form of appendage, with the exception only of the stipules, occur frequently, and characterize genera and families.

On the whole, it is indispensible to distinguish the simple appendages of the petals from the individual foliar organs. To the former belong the scales (fornices) of the Boraginaceæ, the scales of the corona of the Slénaceæ, the formations generally described as coriæ in the Scopoliaceæ and Moutonieæ, the petals of the Irideæ, the nectaria of the Rhamnaceæ, &c.

The corolla consists of one circle, rarely of two (three series in Berberis), or more (four series in Nympheæ). In Monocotyledons the number of members is equal to those of the vessel system. In the double circle of the Poppæaceæ predominates, though it is sometimes composed of two, or four, or of a greater number in Dryas. The number of members is equal to that of the calyx, or greater; very rarely indeed it is smaller; this last case occurs with Haématæ. Suppression 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, in Lepidium runderale, and in some species of Aeser. The coherence of organs in equal numbers has indeed occurred in the calyx as well as the corolla, but not frequently with the stamens.

The corolla, whether with free or with coherent petals, may be regular or only symmetrical. In the latter the blabiate formation is the most frequent, especially in five-membered circles. In such a way that, according as the upper petal is on the upper or on the side of the flower, the upper lip consists of three or of two petals. In the latter case the two are very often little or not at all coherent, as in Tussiliæ; the so-called radiated flowers of the Compositæ (false daisies) is another form; the upper symmetrical flowers are, for instance—the perronate flowers (corolla personata), in which the upper petals of a coherent corolla are so curved inward that they close the entrance of the tube (as in Anthericum), the incised, a portion of the tube being formed by the true blabiate and the upper mouth-like corolla (corolla ringens), in the Labiatae, in which the two petals forming the upper lip often present a concave form overhanging the lower lip, termed gales; the so-called papilionaceous flowers (of the legumes), in which the upper sepal, leaf, which is broad and large, surpassing the others, is termed the standard (vexillum), whilst the lateral petals, as wings (als), are usually dissymmetrically developed, and the two undermost, very frequently coherent, also developed unequally at the two sides, approach each other in a concave form, so as to form the keel (carina). Sometimes all the petals of the papilionaceous flowers become coherent at the lower side of the tube, and form a tube, as in Trifolium; or individual petals are abortive, &c. The most irregular forms are those of the Labiatae, which appear for instance in the Polygalaæae, the Balsamæaceæ, Tropæolaceæ, &c.

All that was said respecting the structure of the perianth holds also for the structure of the corolla, remembering only the differences which the cells vary in colouring matter, and their distribution in groups is sometimes very remarkable. Very dense texture, in consequence of the presence of much-thickened porous cells, as in the Amarantheæ, is frequent. The structure of the epidermis, and its development into papillo, 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 viscid substance, in consequence of which they adhere to the neck of the vessel, in such a manner as happens at the points of the inner petals of the Pumariaæ.

The Epicalyx is seen where these three separate series of foliar organs are distinguishable in the floral envelope, and it is the outermost of these. There are not many plants which exhibit an epicalyx. In form and structure it much resembles the calyx. It occurs with free leaves (as in Passiflora), and coherent leaves (as in Locateria). Its leaves are seldom delicate, such as are seen in the corolla, but are often dry and membranaceous (as in the Rosaceæ), but generally green and leathery (as in the Malvaceæ).

For an account of the other organs of the flower, see STAMENS; FRUIT, S. 2; STIONA; SEED. For the functions of the flower, see REPRODUCTION IN PLANTS AND ANIMALS, &c.

(Schleiden, Principles of Scientific Botany.)

FOOD. The materials taken into the system of organized 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 products of decomposition of these substances are found in the form of the various excretions which are thrown off from the body by the skin, liver, kidneys, and bowels. We shall find, 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:—

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>C</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>H</td>
</tr>
<tr>
<td>Oxygen</td>
<td>O</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>N</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>P</td>
</tr>
<tr>
<td>Potassium</td>
<td>K</td>
</tr>
<tr>
<td>Sodium</td>
<td>Na</td>
</tr>
<tr>
<td>Copper</td>
<td>Cu</td>
</tr>
<tr>
<td>Calcium</td>
<td>Ca</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Cl</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Mg</td>
</tr>
<tr>
<td>Iron</td>
<td>Fe</td>
</tr>
<tr>
<td>Silicon</td>
<td>Si</td>
</tr>
</tbody>
</table>

Few or none of these elements occur in the human body in their pure form; but are combined variously with one another, forming compounds, each possessing very different physical properties and chemical relations. These elements may be divided, for physiological purposes, into two classes; the first four, carbon, hydrogen, oxygen, and nitrogen, being called Organic, while the remainder are called Inorganic elements. The first are called organic elements. They are found universally present in plants and animals, and because no 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 generally present in large classes of animals and plants, are not universal. Man requires phosphorus and calcium in the form of phosphate of lime for his bones; but many 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 are not all derived from the mineral world, and are identical with those of inorganic substances.

The carbon found in the human body is of such a form, in its pure state, the diamond—which enters into the composition of graphite and various kinds of coal, and is found in limestones and chalk, forming a part of the atmosphere of the earth and of the rocks are composed. The hydrogen of the human body is 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 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 identical in and out of the human body; in all these cases it is found that 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 and water, giving out heat during 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 bodies 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 Kohl- or Moor diamonds, or the purest gold, were it not mixed with other substances 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 can see them and not in some more successful. Carbon combines 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 even two chemicals, with all that 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 of form, beauty of colour, deliciousness of scent, deadliness as poisons, and nutritiousness as food. The plant stands between the mineral and animal kingdoms, preparing for the former the sap which is the root of plant life, and for the latter the materials to build up human animals. In the whole range of natural history 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; all game are herbivorous animals, and supply 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>Substance</th>
<th>Quantity</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>63</td>
</tr>
<tr>
<td>Casein</td>
<td>10</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 prominent 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 nerves contain about 800 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 in in the form of drink 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 a large quantity of water. In potatoes, for instance, there are 75 parts of water in every 100.

2. **Oleaginous.** 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 fats and lards, from the former source, and oils and butter from the latter.

3. **Saccharine.** The sugar of the milk represents several substances obtained from plants and used as food. Sugar itself varies in its composition according to its sources; hence we have cane-sugar, grape-sugar, maple-sugar, &c. Sugar has also a composition of a very different kind, 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 cereal grains. Carbohydrate is the name applied to these animal products used as 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 some other animal substances, called fibrine and albumen, a principle which we may term 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 food, and many serious cases of the human frame arise from their absence. They are conveyed into the system by 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 an organic body.

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 above. Some of the substances called condiments, as the various spices, contain volatile oils, 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 thein, 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 medicinal 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. Carbohydrates,** containing carbon as a distinguishing ingredient.

1. **Saccharine.**
   - **Examples:** Sugar, starch, cellulose.

2. **Oleaginous.**
   - **Examples:** Oil, butter, fat.

**Group C. Nitrogenous,** containing nitrogen as a distinguishing feature.

1. **Vital.**
   - **Examples:** Flour, oatmeal, maize.

2. **Animal.**
   - **Examples:** Butcher's meat, cheese.

**Group D. Inorganic.**

1. **From organic sources.**
   - **Examples:** Potash in fresh vegetables, phosphate of lime in flour and flesh.

2. **From the mineral kingdom.**
   - **Examples:** Common salt.

**Class II. Medicinal Substances.**

**Group A. Acids.**

- **Examples:** Citric acid in oranges, tartaric acid in grapes, oxalic acid in rhubarb-leaves.

**Group B. Volatile Oils.**

- **Examples:** Mustard, pepper, nutmeg, cloves.

**Group C. Alkaloids.**

- **Examples:** Theine in tea and coffee, theobromine 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 various articles devoted to these subjects throughout the 'Penny Cyclopedia,' and its Supplements.

Under the head of Wazas will be found 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 stomach, serious ill effects must necessarily arise. The good that is effected by this system of the treatment of disease must be attributed more to the exercise it renders necessary than to the unnatural quantities of water taken into the body.

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 blood in sufficient quantity. A deficient quantity of water in the blood will also prevent the healthy process of nutrition, and wasting and degeneration of the solid parts of
FOO 237  FOO

The body will occur. It would be difficult, perhaps, to lay down any law with regard to the quantity of water individuals should take, and perhaps it is safer to rely on the instinct of the body itself. Our modern methods of cooking, of course, only serve to increase the feeling of satiety that comes on after enough has been taken. We may, however, get at something like an approximation of the proportion of solids and fluids required by the system in food, by examining the composition of food, and what is known as the food value of the various parts. As is 870 to 130 in 1000 parts, or about seven to one.

Thirdly, the good effects of water may be destroyed by the substances with which it is taken. Although the stomach has the power of separating water from the food in which it is contained, if it be done too fast, the parts that are of vital importance are injurious. Water itself may contain a large quantity of saline matters, or of organic matters in a state of decomposition, as to cause serious disease. The taking habitually water in the form of fermented liquors, as beer and wine, as well as the admixture of dissolved spirits, may cause irritation and congestion of the mucous membranes, and derangement of the nervous system.

We now proceed to speak of the Carbonaceous Group. This class of substances is sometimes called Respiratory and Combustible. They are called respiratory, because it is through the function of respiration that they become useful in the system. They are called combustible, because it is through the process of combustion that their effects upon the system are produced. It is, in fact, a fact, that, fact, contribute directly to the nutrition of the body, but they are consumed in maintaining the animal heat. The temperature of the body is always a fixed one; and it is not the temperature of the whole body, but the temperature of the arm, or in any other unexposed part of the body, we shall find that it stands at the point in the index of Fahrenheit's thermometer marked 98.6. This heat the body main-

The human body is preserved at the same temperature by the regulating action of the skin. When large quantities of heat are generated in the body, by exercise or other causes, then the extra heat is carried off by the perspiration from the skin. The skin is a vast surface, and its heat is rapidly conducted away by surrounding cold, the heat is maintained by increased supplies of food belonging to the carbonaceous group. The animal heat of the lower animals varies according to the season of the year. Those performing great muscular exertions, and living in cold climates, have a higher temperature than man; whilst those which are not active in their habits, and live in hot climates, have a temperature lower than that of man.

The substances belonging to this group which enter into the food of man are cellulose, starch, sugar, and oil.

Cellulose forming the external membrane of the cells of all plants is found in all food derived from the vegetable kingdom. It has a composition almost identical with starch, but differs from starch. If there can be little doubt, however, that it is taken up extensively into the system in the food of the lower animals, especially of the Herbivora. When cells are very thick with cellulose they are indigestible, and this will account for many articles of food as carrots, turnips, radishes, uncooked vegetables, &c., not being readily digested. Cellulose is converted into starch by the addition of sulphuric acid, and it is not improbable that some change of this sort may take place when it is taken up by the body. It is not probable that it is utilised by human beings alone, although recommended by no less an authority than Benjamin Franklin, who showed by example that saw-dust puddings might be used as an article of diet.

Starch enters the body in the forms of roots, of man, and of the lower animals. It is distinguished from cellulose by its ready diffusibility in water. On this account it appears to be much more readily absorbed from the stomach or converted into the forms in which food is taken up into the system. Its property of mixing with water and forming with it as a high temperature a gelatious 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 however very generally found in the 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, potatoes, carrots, peas, wheat, barley, oats, and the rest of the Cereals; in coffee, chestnuts, hazel-nuts, 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 ingredient, but in the form of a base in the composition of a part of die. The substances in which it occurs pure arearrow-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 Aracnoideae. There are 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, as potato 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 starch 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 principle, which is not obtained in the tapioca starch is obtained, and by very careful preparing can be entirely got rid of. Arrow-root is used for making cakes, puddings, and a thick gelatious fluid in great request in the sick room. It is a property of starch to combine with water at a tempera-

Starch is one of the commonest articles of diet, and the whole family of starches 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. Those 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 constantly removed by the wear of the body. Now, starch does not perform this function; and, we believe, in the body in maintaining its animal heat. Arrow-root however and the other forms of starch, are frequently mixed with nutritious matters, such as milk and bread; and in this way the food into which they enter becomes nutritious.

Sago and tapioca is another article of diet. Those starches 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 London is in the form of flakes, and is an article of the Indian Archipelago, and is the product of a palm called the true Sago-Palm, or Sagesa lariis. There is however another palm belonging to the same genus, the S. Rumphiis (the Prickly Sago-Palm), which yields the sago that is consumed by the natives of India.

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 the arch-meatman to procure the finer kinds of starch used by the cultivated classes. 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 Esculenta. It is a poisonous plant, and the Indians in the countries where it grows extract 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 different way. The most important difference between the two lies in the 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 value to the starch they contain. Among these we may mention the potato, the carrot, the turnip, the parsnip, the cabbage, the Jerusalem artichoke. From some of these we may mention the potato, the carrot, the turnip, the parsnip, the cabbage, the Jerusalem artichoke. From any of these starch might be prepared. The roots of Arum maculatum, though acrid, contain much starch. When cooked the acridity of the plant is got rid of, and they are
eesculentum). The part of the plant which is eaten is the thick middle rib which runs through the frond. It is sometimes called Chinese Moss.

6. The Dulse of the south-west of England is the Fruticis culitis of botanists. It is eaten by the fishermen of the south-west coast of England, where before eating it pinch it between red-hot irons. In Scotland it is cooked in the frying-pan. It is said to be good when it has been exposed to the atmosphere after a long sea voyage.

6. Dulce of the Scotch, Delik, Delihan, Dulieger, Water-Lef (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 Welsh use it for the same purpose. It is a species of Laminaria, and is sometimes called Kelp. The Atlantic Kelp is, perhaps, the best known species, and is the species which is most commonly used in this country. It is now almost entirely disused in Great Britain.

7. Starch differs in some of its chemical and physical properties according to the plants whence it is obtained. In this work, it is distinguished from the gums and the sugars. Starch is a form of starch obtained from the Inula Helenium, 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 arrow-root 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 given rise to the name of many species of sea-weeds and lichens as articles of diet.

8. One of the plants of this kind, which has been most extensively and is still largely employed, is the Iceland-Moss (Cladonia Isodactyla). It belongs to the family of Lichens, and forms part of the province of the Komplex. This and other lichens probably contain other dietary secrets besides starch, as we find they are capable of supporting animal life. The Reindeer-Moss (Cetraria Rangiferina) is an instance of this. In the northern parts of the world as well as in the south, it constitutes a principal component of the food of the reindeer. There is also an article called the tundra-starch, which is sometimes consumed by the Eskimo for many feet. The Cup-Moss (Cladonia 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. It is the tundra-starch of many of the northern lichens which has been used as an article of diet. There is 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 proboscidea and G. crocea, afford the Frie de Roches. Although they are said to be nutritious, they are described as having bitter, nauseous, and purgative properties.

9. Amongst the sea-weeds which have been used as articles of diet are the Kelp Crowns, that is the Chondrus crispus, under the name of Carragena-Moss, and on the west coast, the Pearl-Moss has had a long time used in Europe. It grows on the rocky sea-shores of Europe; and when washed and dried, and then boiled with water, makes a mucilaginous decoction, like the same preparation of the Iceland-Moss, has been recommended in consumption, coughs, diarrhoea, and other diseases. It has however no bitter principle, and is probably less tonic than the lichen. This and other sea-weeds have occasionally had recourse to by the poor inhabitants of the sea-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 certain preparations of sea-weed which are often eaten as an addition to other kinds of food. There is in all of them 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 be an objection to their general use. Of those which are eaten in various parts of England we may mention:-

1. Laver, Sloke, Slomak (Porphyra fasciata). It is on all the Shetland Islands, and when employed as food is salted and eaten with pepper, vinegar, and oil.

2. Green Laver, Green Sloke, 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. Sea-Gradilla, Sea-Wand, Red Weed (Laminaria digita). 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. Badderlochs, Hon-Ware, Honey-Ware, Murlia (Alaria)


6. The common form of sugar in 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-
The other kinds of sugar which are eaten, are milk-sugar, \( C_{12}H_{22}O_{11} \cdot 3 \cdot SHO \); and grape-sugar, \( C_{12}H_{22}O_{11} \cdot SHO \). It will be observed that the sugar is in the same 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 prevalent in plants as grape-sugar, which is the form in which sugar is found in the fruits and other parts of plants which may be sweet.

The sources of sugar, as an article of diet, is 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). This plant bears luxuriantly 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 Cocos-Nut Palm (Cocos nucifera), and others. It exists in the stems of all grasses, and is prepared in America from Maise (Zea Mays). The Birch (Betula alba) in this country, and the Sugar-Maple in America (Acer saccharum), also yield it in their sap.

Grape-sugar, also called Glucose, is found in the fruits of most plants. It seems 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:—

\[ C_6H_{12}O_6 \rightarrow 2 \text{ Atoms of Alcohol} + 2 \text{ Atoms of Carbonic Acid} + 2 \text{ Atoms of Water} \]

One Atom of Grape-Sugar 12 14 14

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. 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, all the products of the combustion of 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 as 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 as a stimulant it is extensively taken in large quantities upon the mucous membrane of the 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, being seen to act only upon the digestive function, 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 rousing 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 debarring 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, then 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; the most famous of which are 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 addition of other fruits not being tartaric acid. One of the most remarkable properties of tartaric acid is that it forms an insoluble 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 tartric or lees 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 unpalatable. Alcohol is 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 other forms.

In wines made from other fruits besides grapes, the acid is also liable to objection.

Effervescing wines are those which are bottled before the fermentation is complete, so that a large quantity of the carbonic acid, or the other substances left in the wine, is dissolved in the solution in the wine, and escapes when the bottle is uncorked. Such is champagne. Effervescing wines are more liable to disagree with delicate stomachs than others, and the account of their imperfect fermentation rendering them liable to further change in the stomach; and this change is generally communicated to the substances used as food contained in the stomach.

The skins and stalks of the grapes, if not the juice, contain taraxin, a powerful astrincent, and its presence seems to be the cause of the astrincent 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 are the sweeter and flavoured wines. Some of the wines 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 quality 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 than that of another, and thereby affects the development of the peculiar flavour of the wine. Liebig says that the bouquet is dependent on an acid which he calls orananta, and which, combining with the alcohol, forms an ether which gives the odour and flavour to wines.

The quantity of alcohol in wine differs 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 the addition of brandy. Claret, hocks, and Moselies, 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.

Arobert Mallet, in his having been submitted to distillation after the fermentation, which produces the alcohol. Brandy is distilled from wine; and peach-kernels, or other vegetable matter containing oil of bitter almonds, are added to give it a flavour. All the species of the genus Prunus, and especially the apricot, sweet cherries, called Amygdalaceae, contain oil of bitter almonds. Rum is distilled from malasses or treacle in the West India Islands, 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, by the aid of which the distillation is effected in both Ireland 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, ale, 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 obtained through barley. The grain of barley is steeped in 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 when the hops are added, the wort is allowed to take place, and the beer is completed. When the malt is slightlycharred 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 is not only a digestive, but a restorative, and a tonic, as it possesses, in 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 Oligoein 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>Element</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>11</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>10</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1</td>
</tr>
</tbody>
</table>

It will be seen that the oxygen is in considerably less proportion than in the foregoing substances 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 group of foods is limited 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 globe. Just as the direct effect from the tropics, man adds oil to his food according to the degree of cold to which he is exposed.

Fats are also deposited in the tissues of man and other animals as a reserve of food in times of fasting. When they fail in their natural food. Thus the Ruminantia get fat in summer to supply them with their winter's store of fuel. Hibernating animals, which are fat when they commences 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 proteaceous 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 Europaeus) and the Almond (Amgadalis dulcis). Many seeds, as the Cocoa Nut (Cocos nucifera), Sesame (Sesamum), Chestnut (Castanea), Walnut (Juglans), Hazel-Nut (Corylus), Brazil-Nut (Bertholletia), contain oil.

The fat of animals is the great source of olsigenous food from the animal kingdom.

We now come to speak of the Nutritious, Proteaceous, 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 the universal constituent in plants. It also constitutes the chief material of the tissues of animals, in both kingdoms various forms, and is called albumen, fibrin, 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; others derive it indirectly from the plant through the animal, as the various forms of Carinifera. Man obtains his supply of protein from both sources. This has arisen of persons who deny the propriety of man's taking animal food, it may be well to examine the evidence on which his claim to be regarded as a flesh-eating animal rests. We shall dismiss the sentimental objection, that life ought not to be taken as unwholesome because it is the result of suffering. The question is, whether for carnivorous animals to prey upon lower animals is a matter of practice 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 exclusively of a vegetable diet, are satiety, intellectually, 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 most prevalent. Of most complete digestion is the diet that can be provided by an exclusively vegetable diet is scrupulous, 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 diseases provoked by the restricted use of animal food, which are for cure 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 great medical charities of the country, who has the experience of seeing the ill-effects of a vegetable diet, and the benefit, in such cases, of the administration of animal food.

"Not 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 personal observation, but from the experiments of various scientific men, that animal food is more 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. 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 was much more digestible than any of 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 proper mode and degree, instead of the extremes of exclusiveness or starvation, such as we should find in the case of 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 considers the structure that characterises the one or the other combined, he likewise knows 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-feeding animals, and compare them with those of animals which feed exclusively on animal food. There is great difference. The ruminants, as the sheep and the ox, as specimens of pure vegetable-feeding animals. On examining their teeth it will be found that they have broad surfaces, made rough for attrition on each other. The lower teeth the grass and grain they eat are well ground before they are 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 food 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 digestion is effected which is called fermentation. The food undergoes fermentation in the stomach, 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 the tiger, may be taken as the type, we shall find that instead of 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. For this reason, flesh animals are said to be well able to make 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 food that is readily digested.

"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 a some of
them are supplied with the sharp projections which are characteristic of the *Carnivora*; thus evidently adapting them for the mastication of both vegetable and animal food. A slight lateral movement of the jaw and a down action is expressive of the subervision 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 the carnivorous animals. Hence we meet with 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 the earth are not true carnivorous whilst the Hudson's Bay Hunter, some tribes in 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 would prompt the suggestion that man has his 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 vary very 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 appetites. This is made better evident by the fact that it is most nourishing to man when placed 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, albumen 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, etc.; it is 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 is found a substance called Gelatin, which appears to be formed out of the proteinaceous tissues. This substance is a blooded animal's meat 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 even 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 thus almost certain that the hypothesis that 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 an unnecessary food, as it is a part of the really vital parts of the body, it may assist in keeping up certain parts of the fabric. It need not then be rejected from our diet; but it cannot be too widely known, that, as the basis of soups and jellys, it may be administered under the supposition of its being nutritious, and thus lead, if used alone in diet, to disastrous results.

Of the forms of protein which occur in food, Casein demands a short notice. Although, as dissolved in milk, it is very susceptible and becomes, when separated and known the name of cheese, very indigestible. When milk is deprived of its butter, and the pure casein made into cheese, as is the case with some English cheeses, as those from Suffolk, it becomes so hard as scarcely to be digestible. (Guinness.) In the best cases, the butter is curdled with the curd, and a large per-cent of this substance is found in all good cheeses. Stillon cheese is made by adding the cream of one milking to that of another, so that this cheese is less digestible than the better. The indigestibility 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 most of the other plants. In general remarks upon diet, 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 albuminoids, proteinaceous, or gelatinous compounds, since there is no doubt that albumen and casein cannot be added to these. (Pellet.) By adding the first three columns of this table together, and deducting the sum from one hundred, it will give the quantity of water used in each article of food. Thus, taking butcher's meat:"

| Nitrogenous material | 22.3 |
| Carbonaceous material | 14.3 |
| Mineral matter | 5 |
| Water | 37.1 |
| 1000 | 1028.8 |

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.
### Table of Composition of Food in 100 parts.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>4-50</td>
<td>7-90</td>
<td>0-60</td>
<td>6-94</td>
</tr>
<tr>
<td>Butcher's Meat</td>
<td>22-35</td>
<td>14-90</td>
<td>0-50</td>
<td>21-55</td>
</tr>
<tr>
<td>Fish</td>
<td>8-35</td>
<td>60-80</td>
<td>0-50</td>
<td>38-92</td>
</tr>
<tr>
<td>Pork</td>
<td>14-00</td>
<td>60-70</td>
<td>0-70</td>
<td>45-56</td>
</tr>
<tr>
<td>Turkey</td>
<td>14-00</td>
<td>60-80</td>
<td>2-00</td>
<td>40-50</td>
</tr>
<tr>
<td>Oatmeal</td>
<td>15-50</td>
<td>70-50</td>
<td>3-30</td>
<td>44-10</td>
</tr>
<tr>
<td>Pears</td>
<td>10-50</td>
<td>70-00</td>
<td>2-50</td>
<td>36-61</td>
</tr>
<tr>
<td>Peas</td>
<td>22-40</td>
<td>60-00</td>
<td>2-50</td>
<td>32-70</td>
</tr>
<tr>
<td>Rice</td>
<td>5-45</td>
<td>84-65</td>
<td>0-32</td>
<td>36-00</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1-41</td>
<td>22-10</td>
<td>1-90</td>
<td>12-20</td>
</tr>
<tr>
<td>Corncobs</td>
<td>1-48</td>
<td>11-00</td>
<td>0-81</td>
<td>4-30</td>
</tr>
<tr>
<td>Turnips</td>
<td>1-64</td>
<td>10-00</td>
<td>1-62</td>
<td>5-20</td>
</tr>
<tr>
<td>Parsnips</td>
<td>2-10</td>
<td>17-70</td>
<td>0-80</td>
<td>8-63</td>
</tr>
<tr>
<td>Mangold</td>
<td>1-60</td>
<td>12-26</td>
<td>1-14</td>
<td>3-50</td>
</tr>
<tr>
<td>Cabbage</td>
<td>1-75</td>
<td>4-05</td>
<td>2-20</td>
<td>2-65</td>
</tr>
<tr>
<td>Cocoa (nibs)</td>
<td>9-58</td>
<td>86-76</td>
<td>2-70</td>
<td>66-56</td>
</tr>
<tr>
<td>Sugar</td>
<td>0-00</td>
<td>100-00</td>
<td>0-00</td>
<td>45-38</td>
</tr>
<tr>
<td>Bread</td>
<td>0-54</td>
<td>79-00</td>
<td>0-51</td>
<td>75-00</td>
</tr>
<tr>
<td>Cheese</td>
<td>31-02</td>
<td>29-30</td>
<td>4-30</td>
<td>36-80</td>
</tr>
<tr>
<td>Beer</td>
<td>0-85</td>
<td>9-17</td>
<td>0-20</td>
<td>4-32</td>
</tr>
<tr>
<td>Vinegar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Such a table as this will be found useful in constructing diets for large institutions, which are very often erroneously constituted, and a large waste thereby entailed. The following table contains examples of diets, drawn up by Dr. Lyon Playfair, from various sources. It is here accompanied an abstract of a lecture by Dr. Lyon Playfair on the Food of Man, delivered at the Royal Institution in May 1863. The following extracts from this lecture will explain some of the valuable results obtained by Dr. Playfair.

Dr. Playfair admitted that the health of the nation was due to the combustion of the unsaturated ingredients of food. Man inspires annually about 7 cwt. of oxygen, and about 1-0 lb. of water enters a constituent and produces heat. The whole carbon in the blood would thus be burned away in about 3 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 respirations and heat diminishes them, and the lecturer tested well-known cases of the voracity 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 arctic diets shown in the table, which, admitting that they are extreme cases even in the arctic regions, are nevertheless very surprising.

Dr. Playfair then alluded to the second great class of food ingredients, namely, those of the same composition as flesh. Becaria 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 athletes, guinea pigs, &c., are now re-named as flesh-formers in the same sense that any animal aliment is.

The old mode of estimating the value of dietaries, by measuring the number of pounds 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 1860 the potato famine subsisted chiefly on flour, consuming 168 ounces weekly, which contained 320 ounces of flesh-formers. When potatoes ceased he returned to a potato diet, and now eats 321 ounces weekly, although his true nutrition in flesh-formers was only 8 or 10 ounces. He shows his further advantage by mentioning six pauper diets 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 nutritive value.

I think the soldier and sailor, as illustrating healthy adult men, they consumed weekly about 35 ounces of flesh formers, 70 to 74 ounces of carboon, the relation of the carbon in the flesh-formers to that of the heat-givers being 1:3. It is additional to what was already stated above with this it would be found that they consumed less flesh-formers (35-90 ounces), but rather more heat-givers (72-80 ounces); the relation of the carbon in the former to that of the latter being 1:5. The young boy about 10 or 12 years of age required about 172 ounces carboon and half the flesh-formers of the adult man; the carbon being about 88 ounces weekly, and the relations of the two carbons being nearly 1:5. The circumstances under which persons are placed influence the proportion of diet. Employing the workhouse in prisons the warmth renders less necessary a large amount of food fuel to the body; while the relative amount of labour determines the greater or less amount of flesh-formers. Accordingly it is observed that the latter are increased and the former diminished as the amount of work. In the quantity of meat-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, 27-8 lbs. in his muscular substance, &c., and about 0-5 lbs. of nitrogenous matter in the bones. The whole 37 lbs. would be received 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 the case.

"All the carbon taken as food is not burned in the body, part of it being excreted with the waste matter. Supposing the respirations to be 18 per minute, a man expires about 8-99 ounces of carbon daily, the remainder of the carbon appears as waste 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 malonic acids; volatile oils 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, and forming the necessary substances in the body, by which the carbonic acid acts beneficially when taken in wines, beers, and effervescing 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 diet. We may class these, with alcohol, as stimulants 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. They are said to be the most powerful stimulants, the tea, coffee, and chocolate, in every instance, to which the name Thein 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 influence of spirits may be attributed."

Two theorems have been advanced to explain the action of this principle. 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 for the production of the carbo- naceous matter 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 carbonaceous matter not got rid of, and disease is engendered. If persons have not sufficient taurin, or if the digestive organs do not enable them to carry a sufficient quantity of nutrient to the system, the tissus of the body are consumed to form taurin. Liebig had found that their composition was identical with taurin, and so easily as to render it a sufficient substitute for taurin, and thus by the use of them, he supposed we were actually preventing the waste of the body, and so maintaining health at less expense than 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 we can maintain our existing population."

If the subject of taurin has been advanced by Dr. Playfair. He says they have a 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 functions. 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 falling, iron is given medicinally. Potash in combination with vegetable acids seems to have the power of preventing scurrvy. Chloride of sodium is another well-known instance of the necessity of mineral ingredients in the food.

Examples of Diaries.

<table>
<thead>
<tr>
<th>Weight in oz. per week</th>
<th>Nitrogenous Ingr.</th>
<th>Substances free from Nitrogen</th>
<th>Mineral Matter</th>
<th>Proportion between Carbon in Flesh formers</th>
<th>Carbon in Heat givers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carbon in</td>
<td>Carbon in Heat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>flesh formers</td>
<td>heat givers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIVERSITIES OF SOLDIERS AND SAILORS:

| English Soldier in India| 261 | 58:15 | 109:19 | 4:90 | 66:32 | 1 | 5:58 |
| English Soldier (Fresh Meat)| 309 | 58:15 | 109:19 | 4:17 | 70:55 | 1 | 5:70 |
| English Soldier (Salt Meat)| 292 | 40:83 | 132:00 | 6:04 | 37:40 | 1 | 5:94 |
| Dutch Soldier, in War    | 198 | 35:26 | 102:08 | 3:36 | 74:86 | 1 | 5:67 |
| Swiss Soldier, in Peace  | 342 | 53:24 | 127:76 | 4:72 | 63:25 | 1 | 4:72 |
| French Soldier           | 242 | 21:24 | 102:00 | 2:45 | 62:45 | 1 | 4:47 |
| Swiss Soldier            | 242 | 21:24 | 102:00 | 2:45 | 62:45 | 1 | 4:47 |

DIVERSITIES OF THE YOUTH:

| Christ's Hospital, Hartford | 212 | 17:16 | 61:27 | 2:47 | 59:18 | 1 | 4:21 |
| Christ's Hospital, London   | 242 | 17:27 | 76:02 | 2:44 | 46:95 | 1 | 5:02 |
| Chelsea Hospital, Boys' School | 245 | 12:39 | 98:28 | 8:93 | 67:67 | 1 | 6:29 |
| Greenwich Hospital, Boys' School | 231 | 19:43 | 86:78 | 2:62 | 52:97 | 1 | 5:29 |

DIVERSITIES OF THE AGED:

| Greenwich Pensioners      | 269 | 24:46 | 122:21 | 5:44 | 72:48 | 1 | 5:46 |
| Chelsea Pensioners        | 255 | 29:55 | 119:64 | 4:95 | 78:93 | 1 | 4:90 |
| Gillette Hospital, Edinburgh | 146 | 21:02 | 92:32 | 2:35 | 71:39 | 1 | 6:28 |
| Trinity Hospital, Edinburgh | 192 | 19:53 | 97:34 | 3:33 | 57:30 | 1 | 5:38 |

OLD FATHER DIVERSITIES:

| Class 1                   | 20:21 | 88:61 | 2:27 | 54:30 | 1 | 4:95 |
| Class 2                   | 14:56 | 89:59 | 2:30 | 61:10 | 1 | 6:31 |
| Class 4                   | 19:22 | 116:84 | 2:96 | 67:67 | 1 | 5:60 |
| Class 5                   | 15:49 | 96:51 | 2:85 | 47:72 | 1 | 6:33 |
| Class 6                   | 14:67 | 88:03 | 2:64 | 43:37 | 1 | 6:28 |
| Average of all English Counties in 1841 | 22:00 | 99:99 | 2:90 | 58:90 | 1 | 4:85 |
| St. Guthbert's, Edinburgh  | 175 | 14:60 | 89:37 | 3:01 | 49:66 | 1 | 5:85 |

ENGLISH PRISON DIVERSITIES:

| Class 2, Males            | 206 | 15:28 | 111:85 | 5:46 | 59:23 | 1 | 7:13 |
| Class 3, Males            | 276 | 18:26 | 123:60 | 4:05 | 67:53 | 1 | 6:81 |
| Class 4, 8, and 10, Males  | 275 | 20:57 | 132:50 | 2:90 | 62:68 | 1 | 6:14 |
| Class 5, Males            | 226 | 20:29 | 130:57 | 2:45 | 75:81 | 1 | 6:65 |

BENGAL PRISON DIVERSITIES:

| Non-Labouring Convicts     | 224 | 18:43 | 169:16 | 3:06 | 79:35 | 1 | 7:02 |
| Contractors' insufficient Diet | 167 | 12:70 | 195:85 | 1:50 | 61:33 | 1 | 5:83 |

BOMBAY PRISON DIVERSITIES:

| All Classes of Prisoners not on Hard Labour | 182 | 20:00 | 101:50 | 2:03 | 68:81 | 1 | 4:92 |
| Prisoners on Hard Labour          | 224 | 35:53 | 126:00 | 2:45 | 87:22 | 1 | 4:50 |

ARCTIC AND OTHER DIVERSITIES:

| Equiavour                | 256 | 60:00 | 128:00 | 1:12 | 112:50 | 1 | 7:22 |
| Yarci                    | 256 | 60:00 | 128:00 | 1:12 | 112:50 | 1 | 7:22 |
| Boijimarian              | 624 | 36:90 | 40:00 | 1:00 | 60:04 | 1 | 5:00 |
| Eatostojt                | 169:6 | 36:34 | 106:67 | 1:19 | 74:79 | 1 | 7:02 |
| Agricultural Labourers, India    | 219:0 | 14:02 | 138:27 | 2:41 | 61:34 | 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 seeds 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 this 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. Meals of such kind are less digestible than others, and when taken in small quantities are less injurious. 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 —

Uncooked bread and biscuits, uncooked vegetables eaten as salad, unripe fruits, cheese, pie-crust, fat meats smoked, as bacon, and the fat of meat, some kinds of fishes, especially the Crucianes, crabs, lobsters, etc. Heavy meals of any one of these articles of diet, or mixtures of them, may be very injurious, and produce serious attacks of indigestion, and may even be fatal to persons not otherwise diseased.

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 immediately a loss of health. Much food 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 putsrids, producing pain and taints 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 action of the pepsin of the stomach, and the 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 to table with some appetite than that no more food could be taken. It is always difficult to show much 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 always in all cases of the same level. How much shall one be satisfied with 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 about 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 incubus are not frequently attended with success.

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 evening 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 longer, it should be always rechristened, that as a rule children should have more eating times than adults. Grown-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 restricting them to the taking of their diet amount. It is the rich as come upon them from absolute want amongst 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 treacle, or cornflakes or marmalade or any other food for 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 whilst growing a habit is 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.

Older persons require less food 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 habit of youth and middle age has cost many decline in the vigor of their lives.

The mode of life influences the diet. The sedentary, the inactive, do not consume so much muscle and nerve in their existence as the active and laborious, and accordingly require less food. Hunger is the commonest danger of 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 the body from a deep freezing. The Midsummer dinner 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 fever brought on by repulsion.

(Moleschott, Physiologie des Nahrungs Mittel; 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; Pereira, On the Diet of the Poor; Carpenter, Principles of Eating; Healthy, Carpenter, Principles of Physiology.)

FORAMINIFERA (Foramen, foro), a group of minute Marine Animals of low organisation, consisting of a slimy envelope containing a hard calcareous shell; found in sea-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 highly organised Mollusca, allied to the living Nautilus, an 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 early attracted the attention of naturalists. They were noticed by Guernier, Planchus, and Ledermuller, 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 its food, being so much alike; but Linnaeus associates them, being alike unknown to the Swedish naturalist. In the 12th edition are descriptions of 15 species. In 1780 Soldani, an Italian priest, published two volumes of observations on the foraminiferous shells. He divided them into groups (such as Navulli, Hammoniac, and Orthocerata) in the most arbitrary manner; but the works are monuments of his labour and perseverance. In 1796 four remarkable species were described by C. d'Orbigny, as 'Testascula Rario.' The 'British Conchology' of Montague, 1803 (and 'Supplement,' 1808), 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 Nausita; as to warrant the attempt to 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 polytypes of a Sertularia or of a Gorgonia, appear to me wholly inadmissible. If the soft structures of the calcareous skeleton, and the less well marked or less perfectly calcified parts of the 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 Polyplacophora, only possessing a smaller symmetry of its articulations, which make it the subject of internal and internal." (Transactions of the Microcopic Society of London.)

In 1846 M. D'Orbigny published his work 'On the Foraminiferous Tertiary of the Basin of Vienna,' in which he also described the 'Polyplacophora.' It was evident that in 1853 he had now recognised the organic relations of these objects to the Cephalopoda, with which he had previously arranged them. He rejected the idea that they were aggregated creatures, as held by Ehrenberg, as also the existence of the intestinal canal and organs of reproduction described by the illustrious Prussian; but he arrived at the conclusion that they held a position intermediate between the Polyplacophora and the Echinoidea.

M. D'Orbigny says, "After what has preceded upon the characteristic of the Foraminifera, the comparison demonstrates that they cannot be arranged in any of the known Zoological Classes. Much less complex than the Echinoidea or the Polyplacophora as to their internal organisation, they are both species 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, liberty which they enjoy, and their mode of locomotion, are characteristics which take them to a position intermediate between the Echinoidea, to which they are very inferior in all respects. Although less complex than many Polyplacophora, they have not a common aggregate life. A multitude does not unite to form a regular body as among the Polyplacophora. They are entirely locomotive, and their mode of locomotion is complex, and the great regularity of the testaceous envelope of their segments places them far above the Polyplacophora. On the other hand, much less perfect than the Echinoidea, they are very inferior to them in all respects. We believe also, that, because of the nature of their elements the position of the Foraminifera is in the interval (embracement) of the radiating animals of Cuvier, between the Echinoidea and the Polyplacophora, as an altogether independent class of the Foraminiferous Fossils of the Basin Tertiary of Vienna, p. 19.'

There can be no doubt of their great inferiority to the Echinoidea, which possess a distinct alimentary canal, a nervous circulatory and sexual system; and connecting the whole of their collective circulatory and nutritive canals. The discoveries respecting its reproduction by ova, through the agency of medusiform buds, 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 Polyplacophora, in their embryonic or larval states. Consequently this feature, which in the Foraminifera is normal and permanent, betokens inferiority rather than superiority to the Polyplacophora, 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 (Dendroidea) 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 probable correctness of the views he held, and added much furnished by the structure of a species of Faucina, and especially showed that the new growths which added to the thickness of the shell were all applied to its exterior and not incorporated into it. With respect to the gelatinous animal had the power of extending itself over the exterior of the 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 Pogonophora, and described by Rimmer Jones, 'Animal Kingdom,' p. 10.' In 1845 Dr. Carpenter laid before the Geological Society of London an elaborate memoir
on the structure of some interesting fossil forms belonging to the genera Stichostega and Holostega, 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 Foraminifera. As has already been marked by some serious imperfections, it is the best that has been hitherto published. The five principal divisions are chiefly based on the variations in the arrangement of the successively added segments.

Order 1. Monostega.—Animal consisting of a single segment. Shell composed of a single chamber. Genera: Cristatella, Dendrita; Orbulina, D'Orbigny; Colonatella, D'Orbigny.

Order 2. Stichostega.—Animal consisting of segments arranged 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.
- Orthospinella, D'Orbigny.
- Dentalina, D'Orbigny.
- Prondolium, D'Orbigny.
- Lingulina, D'Orbigny.

Order 3. Helostega.—Animal consisting of segments arranged in a spiral. Chambers piled up or superimposed on one another, forming a spiral volute—
- Cristatella, D'Orbigny.
- Planellina, D'Orbigny.
- Robulina, D'Orbigny.
- Pusulina, Fischer.
- Nexterna, D'Orbigny.
- Nodularia, D'Orbigny.
- Assulina, D'Orbigny.
- Siderolina, Lamarck.
- Lanerina, D'Orbigny.
- Operculina, D'Orbigny.
- Endosulina, D'Orbigny.
- Polydoloma, D'Orbigny.
- Peneroplus, Lamarck.
- Dendrilla, D'Orbigny.
- Spirilla, D'Orbigny.
- Cyclolitula, D'Orbigny.
- Litola, Lamarck.
- Orbulina, Lamarck.

Order 4. Eustomostega.—Animal composed of alternating segments forming a spiral. Chambers piled up or superimposed upon two alternating axes, forming a spiral—
- Eucyclos, D'Orbigny.
- Heterostegina, D'Orbigny.
- Cantiana, D'Orbigny.
- Amphistegina, D'Orbigny.

Order 5. Enallostega.—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.
- Testitaria, D'Orbigny.
- Polydoloma, D'Orbigny.
- Virgulina, D'Orbigny.
- Bigerella, D'Orbigny.
- Cunulina, D'Orbigny.

Order 6. Agathostega.—Animal composed of segments wound round an axis. Chambers wound round a common axis, each one investing half the entire circumference—
- Uniloculina, D'Orbigny.
- Biloculina, D'Orbigny.
- Filonatica, D'Orbigny.
- Filonatica, D'Orbigny.
- Scribula, D'Orbigny.
- Spirilla, D'Orbigny.
- Triplacina, D'Orbigny.

The simplest type of the Foraminifera (Monostega), presents but a single segment, and is illustrated by the Orbula unispiralis, which is a small spherical 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 Lagenaria, or Flask Animals (Fig. 3), the British species of which have been figured by Professor Williamson in the *Annals of Nat. Hist.,* also belong to this type.

In the order Stichostega, as for example the Nodosaria, Dentulina (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 Orbula, 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 shelly 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 Holostega, a large and conspicuous group, the segmentation 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 approximates those previously formed, and conceals them. (Cristatella, Fig. 5.) In a third type all the spiral convolutions are visible on one truncated half of the shell, whilst they are embracing on the others (Panjasinga, Fig. 6), thus combining the other two types. Some genera, like the Stichostegus and Helostegus 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 (Spirula, Fig. 7), as in the Nodosaria. The orifices penetrating the serpina and connecting the contiguous segments are sometimes single, and at others more numerous.

In the Enallostegus the shell is spiral as in the Holostegus, but instead of each chamber being equilateral, it has a larger and a smaller side, the position of which is alternately reversed as the segments are multiplied. (Cantiana, Fig. 8.)

In the Enallostega the new segments are arranged alternately on opposite sides of a central line, so as to form two parallel, non-spiral, alternating series (Testitaria, Fig. 9), the segments being connected by a single orifice.

The Agathostega present an entirely different aspect, as well as structure, from the rest of the Foraminifera. They are much less transparent than the majority of the other orders, being composed of a material resembling white porcelain, and which presents a rich amber-brown hue when viewed by transmitted light. They are usually more or less oblong, and as each new segment is equal to the entire length of the shell, it follows that the terminal orifice presents itself alternately at its opposite extremities. Sometimes the new segments are spread out in one uniform plane (Spirula, Fig. 10), at other times each new segment instead of being exactly opposite its neighbour, is a little on one side of it; consequently the chain of segments is wound round the
primary central one, as the thread is around a ball of worsted. (Orbiculina, Triloculina.)

In the great majority of the species the interior of each chamber is simple and undivided, but there are some forms, especially amongst the Helicotecta, 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. (Orbiculina, fig. 11.) Ordinarily but one such chain of communications exist (animal of Rostovia, fig. 13); 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 orifices affects the gassination 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 Orbiculina, this growth is sometimes so remarkable that the new segments soon form concentric circles, embracing all those previously formed. (Orbiculina complanata, fig. 11.) In such examples the connecting apertures are distributed round the entire periphery, and gassination most probably takes place simultaneously through them all; so that the soft animal, if decalcified by an acid, would present a succession of rings, enclosing one another, and connected together by transverse radiating bars.

but as additional calcarceous chambers are formed, each such addition not only encases the new generation of the soft animal, but extends over all the exterior of the previously-formed shell. The exact way in which this is accomplished is doubtful; but it is probable that the soft animal has the power of covering itself over the shell, and depositing upon its surface addition of calcarceous bands of high magnifying powers. Through these foraminifers, long delicate processes of the soft animal, termed pseudopodia, are protruded. The exact use of these, whether for tactile, probenial, and locomotive purposes, or for the diminution of the nutritive food, or for other purposes, is not at all clear; but they are useful in some degree each of these functions. They may be regarded as analogous to the prolongations which the Protes Animalcule (Amoebae) extends in various directions; only in the Foraminiferous these organs are more delicate as well as more uniform in thickness than in the shell-less creature referred to.

Professor Williamson has also demonstrated the existence in several species of a curious system of intersecaes and accessory canals which run vertically amongst the chambers forming the walls of the shells. (Horizontal section of Pennaria, fig. 14.) These are especially obvious in the genera Pennaria, Opunculina, and Amphistegina. The tubes open at the exterior of the shell, especially at the peripheral margin, either by a few large or numerous apertures. These canals are probably designed to admit water to the interior segments of the animal, with which they communicate through the minute foramina. In some cases the pseudopodia are protruded through each of these canals as are situated in the umbilical region; but these appear to be exceptional instances.

The relations of the Foraminifers to Paleontology render them interesting objects to the geologist. Many of the more recent calcarceous strata chiefly owe their origin to their 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 limestones have been so altered by pressure and chemical agents 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 sediment now accumulating in the bottom of the sea are charged with these little organisms, and in some cases entirely composed of them.

The fossil Foraminifers are chiefly distinguishable from recent ones in the greater prevalence of specimens of comparatively coarse texture. Though very rare, they are brought from Borneo by Sir E. Belcher measuring more than two inches in diameter, the living forms usually range from the 4th to the 14th of an inch. But the Tertiary strata of the earth abound in examples of the fossil genus Nummulite (Nummulina, fig. 16), 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 Northern India. The Mokadam Mountains in Egypt, where the stone used in building the pyramids was obtained, chiefly consist of these Nummulites which are known to the natives by the name of Pharaoh’s Pennes.

The structure of the Nummulites has been investigated by Messrs. Jolie and Leymerie, and especially by Dr. Carpenter, whilst the specific forms have been studied by M.D’Archiac. The genus belongs to the group of the order Helicotecta, in which the outer convoluted one apparently 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 pseudopodia are all of different 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 Orbulina, occurs in America, Switzerland, and India; but the only known species which it is possible to represent the Nummulites of the Old World. The labours of Dr. Carpenter have revealed a remarkable structure in this
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genius, but one that appears to have some recent representatives.

Forster, F. Forrest, F. Forster, S. 1.

FORBES, 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 pack up his collecting basket and set out on the mountain paths of his native isle, where he could hardly 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 Systema Naturae of Linnaeus,' at the age of fifteen. He had read Burchard's 'Relieque Diluvii,' Parkinson's 'Organic Remains,' and Conybeare's 'Geology of England.' Such was the impression produced on his mind by the perusal of these works, that he ever afterwards despised those who were content to remain, after their travels, with a mere name.

His first 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. Sass in Charlotte-street, London. This profession did not however comply with his desire to root himself to the earth. In 1832 he repaired to the University of Edin- burgh with the object of studying medicine. Here under the teaching of Professor Jameson and Graham he first became acquainted with the true principles of natural science, and the ardour and desire for the pursuit of knowledge which his acquaintance with the latter imparted to him induced him to become himself an observer and add to the already accumulated store 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 minerals of the country, and afterwards published the result of his observations in a paper in the 'Magazine of Natural History,' entitled 'Notes of a Natural History Tour in Norway.'

A large portion of his natural history career he had recognised 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 depth 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 'Distribution of the Dredgings in the eighth and ninth 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 at the time. But his objects were the 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 professed more largely by the botanical excursions of the late Professor Graham. This habit of excursionalising he held constituted a most important element in botanical 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. While 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, which he helped to found, and in 1837 he visited Paris, attended the lectures of the Professors 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 1838 he published an account of the 'Molluscs of the Isle of Man,' and in 1839 papers on the 'Land and Freshwater Mollusca of Algiers,' and on the 'Distribution of the Pulmonifers of Europe.' In these researches he was laying the foundation for the enlarged views which he afterwards held forth, with regard to the distribution of the geaptera and geapterid animals 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 adhered to paleontology, but a comparatively small proportion 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, which his own pencil were worthy of a disciple of Bewick. In this year he accepted the appointment of naturalist to H.M.S. Beagle, commander Captain Graves, who was commissioned to bring from Lycia the marbles discovered by Sir John Fenton. He opened up to him. For the first time the 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 corresponded in parallels of latitude. This law was announced at 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 and conclusions. But a few years after his death the government offered to purchase from him the manuscripts of his voyages and observations, and he accepted the offer, and his great work was given to the public.

In 1844 he was in Lycia that he contracted the same form of remittent fever which killed one of his companions, the Rev. Mr. Daniel, and from the effects of which he suffered to the day of his death.

When away in the 'Beagle,' 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 new deliberately gave up the more lucrative, 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, and the growth of his scientific reputation, which seemed to systematise his knowledge, and developed 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 proceeded 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 placed at the head of the geological laboratory which was established in conjunction with 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 Journal, the Proceedings of the Zoological Society, and the Transactions of the Geological Society, and the great observing powers and unsurpassed 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 continuous 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 for many centuries, there was a direct land connexion 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 elected president of the geological section of the British Association, which met at Liverpool in September. He died on the 18th of November in the same year. The Edinburgh chair was the object of his highest ambition. The increasing years of life, combined with the disease of the kidneys which he was a student that he might one day hope to fill this honourable post. 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 execute the first part of it, when 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 1848. 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 Spalding's "Phytogeographic and Zoological Atlas." He also indulged in general literature, and the world was somewhat surprised after his decease to find that for some years he had been a contributor to the review department of the "Literary Gazette." His papers were collected together with some unprinted papers by the late Edward Forbes. The third volume of the "Bibliographia Geologica et Zoologica" of Agassiz and Strickland, published by the Ray Society in 1850, contains a list of eighty-nine papers and works supplied by the author himself, and arranged in a 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 laboured more assiduously in the path of natural science, or 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 upon the time in which he lived.

FORDINGBRIDGE. [HAMPSHIRE.]

FORESTALLING. This offence, long obsolete, has at length, with others of the same character, ceased to exist. [7 & 8 Viet., c. 94.]

FORESTAY-GOT. [MYCENOS, S. 1.]

FORMICA, a genus of Insects belonging to the family Formicidae. It is distinguished by having the foot-stalks of the abdomen composed of a single joint, the mandibles triangular, and the antennae attached at the edge. The females are destitute of a sting. This genus comprises about a dozen British species, the largest of which is the Hill-Ant or Horse-Ant, *F. rufa.* The neuters in this species are about a third of an inch long, of a black colour, with the thorax, abdominal scales, and legs black; the head and the conical nest in the open ground, in woods, &c., amassing together large quantities of sticks, straws, &c. For a description of these nests see Ant. *F. nemorum* is of a blood-red colour, the eyes and abdomen black, and the wings dull at the base. The neuter is similarly coloured, except that the head is darker. The male is black, with red legs. This species burrows in wood, and is one of those which steals the young of other species, rearing them to perform the duties of the nest. Two of the species subject to these marauders are *F. cunicularia* and *F. fusca,* both of which are inhabitants of this country. The latter species is of a shining black colour, with a slight ash tinge; its form is rather long, and it is nearly smooth; the thorax is yellow. The so-called *F. rufa* is 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 underground. Among the exotic species of this genus are to be found many which are extremely injurious or annoying in their habit. 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, lime-trees, and lemon-trees, where it bruises the leaves so that 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 injuriousness of this insect was so great that a reward of 20,000l. was offered by the planters to any one who should discover an efficient mode of destroying them, yet nothing could be found to stay their ravages. The aid of fire was even resorted to in vain; the ants were not more than a year or two removed as to extinguishing it. Heavy torrents of rain at last effected their destruction. *F. sинфius,* another exotic species, is described by Colonel Sykes as being an extraordinary instance of the operations of insects for the benefit of plants. These 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 confectionery 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 alighting upon the table and slitting 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.

FORMICIDAE, an extensive family of Hymenopterous insects, belonging to the section Aculeata, and to the sub-section Heterogyna of Latreille, comprising the Linnean genus Formica, the largest of all the species of Ants. The family is distinguished by the wingless state of their abortive females, by the great length of the basal joint of the antennae in the females and the neuters, in which they are elbowed at the extremity of this joint, and by the first or the second joints of the abdomen being knotted; the uterus of the neuters is large, horned, and perpendicular, falling between the jaws; the eyes are rounded, or oval and entire; the jaws are large in many of the species, the form of these organs varying greatly in many of the species. In their structural character the *Formicidae* resemble the *Tephritidae* and *Dorylidae* belonging to the section of the Sand-Wasps. The neuters are smaller than the males, and these are smaller than the females; the abdomen in the first and last of these sexes is composed of a single joint, in the middle of the female and neuter are furnished with a sting in many of the 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 ulcers.

The various genera of this family, according to Latreille, are: — *Formica, Polyergus, Poneria, Myrmica, and Atta.* This last genus differs from *Myrmica* only in having very short palpi; the head of the workers is generally very thick. *Apisflata* is the Visiting Ant of the West Indies.

FORMYLE. [CHEMISTRY, S. 2.]

FORRES. [ELGINSHIRE.]

FORSTER, FRANK, civil engineer, was born in the year 1800, near Norwich, and was educated at the Bishops' School. He was resident engineer of the portion of the Chester and Holyhead Railway, 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 Railway Commission in 1845, Mr. Forster was appointed engineer, and was instructed to furnish a general scheme of 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 contending opinions and interests. He himself was freely animadverted upon by the press, and was at length compelled to resign his appointment, and died suddenly a few weeks afterwards, on the 15th of May, 1847, in his 46th year. His schemes and plans, with reference to the drainage of the north of London remain, 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.

FORTOUX, HIPPOLYTE, late Master 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 was closely identified with the French movement. He was befriended by Béranger the poet, of whom, in 1830, he 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.' Meantime, by the aid of his stepfather, a rubber merchant of bath, he began to acquire a small income. He was made Professor of Literature in the university of Toulouse, where he distinguished himself as a lecturer, and was afterwards recompensed for his services by being appointed Dean of the Faculty of Art. He was also admitted into the French Academy in the section of Belles Lettres.
Lettres. After the revolution of 1848 he was elected a member of the French National Assembly, in which he spoke frequently, and obtained the favor of the Prime Minister. Immediately after the close of that he was appointed, December 3, 1851, Ministre d'Instruction Publique et des Saltes, and was one of the six ministers who signed the decree for the confiscation of the estates of the house of Orleans. He made himself popular in the capital of France by the decision 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. Magne, on the 7th of July, 1851. The decree for the suppression of him buried at the public expense, with the firing of guns, processions, and other honors, on the 12th of July, in the church of St. Thomas d'Acquin, Paris.

FOSSORES. [Hyemepstafa.]

FOSTER, JOHN, architect, was born about the year 1758 or 1757, and was the son of a builder of the same name, who carried on a large business in Liverpool where he also acted as architect and surveyor to the corporation, and as engineer to the docks. Foster junior was the second of six sons. According to one account furnished to us, he became a pupil of James Wyatt; and from other information it would seem that he was employed under Jeffry Wyatt, afterwards Sir Jeffry Wyatville. In 1800 he was associated with him at some time with Mr. Cockrell at Agina and Phigalaia; and was concerned in the excavation of the Aginian and Phigalian marbles. The portico at Agina—that of the temple of Jupiter was designed by him with favor, and in his latter practice as an architect. He did not return to England till 1816 or 1817, having in the meanwhile, at Smyrna, married a Greek lady of that place. However, about the time mentioned, he settled at Liverpool; and for some years afterwards carried on the building business, in partnership with a brother, under the firm of John Foster and Co.—his father having withdrawn, but retaining his professional appointments with the corporation and dock trustees. It does not appear that the numerous buildings in which Foster, senior, was concerned, were erected from his own designs; Foster, junior, however, had received better education in art; and for some time, besides his building trade, had considerable practice as an architect. St. John's Market, in Liverpool, a covered area of little short of two acres, and one of the earliest works of its character, was commenced in 1820, "from the designs of Mr. John Foster, the corporation-surveyor of the day, and was completed and opened for public use in 1826. The 'Architectural History of Liverpool' by Mr. J. A. Picton, read at the Liverpool Architectural Society; see 'The Builder,' vol. xii. p. 231.) It is probable however that such architectural design as there is in the work was due to the younger Foster, who with his brother was retained for the erection of the principal Liverpool public buildings. But Foster, senior, having been compelled by ill-health to resign his several appointments, Foster junior was appointed in February 1824 corporation architect and surveyor, receiving a salary of 1000l. per annum, conditional upon withdrawal from the building business. When the Municipal Reform Bill came into operation in June 1835, much of the influence of the Foster family was brought to an end, and John Foster retired with a compensation of 600l. per annum, and did not afterwards follow his profession.

Few architects have had opportunities similar to those of John Foster. It may however be questioned whether he succeeded in turning these to proper account. That he had acquired a thorough training cannot be doubted; but, like many of his contemporaries, he missed the special beauty of art in architecture in his manner of using the Greek models; and perhaps there is no town which now so well affords illustrations of two different systems of practice, as does Liverpool. We have said the works of Foster and the great work of Elns. [ELMS, HARVEY LONSDALE, S. 2.]

Amongst Foster's works is the church of St. Michael, Pitt-street, commenced in 1816, though not completed till 1822. It is a handsome, regular, portico, and steeply obviously adapted from the church of St. Martin's-in-the-Fields in the metropolis, but is by many considered his best work. The church for the School of the Blind first erected in Holborn-street, and since removed and re-erected in Highbury Park, is described as externally presenting a somewhat imposing effect in its Grecian Doric columns. This has been impaired by alterations in the removal. The
### FA A

<table>
<thead>
<tr>
<th>Department</th>
<th>Area in Sq. Miles</th>
<th>Population in 1831</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maine-et-Loire</td>
<td>2,761-3</td>
<td>516,652</td>
</tr>
<tr>
<td>Manche</td>
<td>2,261-0</td>
<td>606,882</td>
</tr>
<tr>
<td>Marne</td>
<td>3,138-6</td>
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<td>Mayenne</td>
<td>2,409-0</td>
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</tr>
<tr>
<td>Meurthe</td>
<td>2,431-5</td>
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<td>Meuse</td>
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<td>Mortain</td>
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<td>330,975</td>
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<tr>
<td>Morbihan</td>
<td>2,738-9</td>
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<tr>
<td>Moselle</td>
<td>2,077-8</td>
<td>403,638</td>
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<tr>
<td>Niévre</td>
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<tr>
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<tr>
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<td>Tarn</td>
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<td>Var</td>
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<tr>
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<tr>
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<tr>
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<td>427,409</td>
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<tr>
<td>Yonne</td>
<td>2,268-0</td>
<td>385,133</td>
</tr>
</tbody>
</table>

**Total** | 204,922-9 | 35,781,628

According to the census of 1831, the population of France was divided into—Roman Catholics, 34,931,023; Réformés, 260,067; Luthéria, 267,825; Jews, 73,995; other religions, 26,338. Of the rest the religion was unknown.

The population of France at the commencement of the 18th century was about 19,080,500, exclusive of Corsica and part of Lorraine, which were not then united to France. In the year 1763 the population had increased to 21,799,163, inclusive of Corsica and the whole of Lorraine. In 1784 it had further increased to 24,800,000.

The following table shows the different census returns of the present century, has been stated to be as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
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</thead>
<tbody>
<tr>
<td>1801</td>
<td>27,549,068</td>
</tr>
<tr>
<td>1811</td>
<td>29,193,244</td>
</tr>
<tr>
<td>1821</td>
<td>29,417,975</td>
</tr>
<tr>
<td>1831</td>
<td>32,569,223</td>
</tr>
</tbody>
</table>

**Total** | 197,963

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>Algérie</td>
<td>2,280,583</td>
</tr>
</tbody>
</table>

In 1857 the Europeans were 167,570.

<table>
<thead>
<tr>
<th>Republic</th>
<th>29,693</th>
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</thead>
<tbody>
<tr>
<td>Corsica</td>
<td>5,137</td>
</tr>
<tr>
<td>Martinique</td>
<td>2,756</td>
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<tr>
<td>Martinique</td>
<td>10,303</td>
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<tr>
<td>Mayotte</td>
<td>2,893</td>
</tr>
<tr>
<td>New B.</td>
<td>15,718</td>
</tr>
</tbody>
</table>

**Total** | 2,591,593

### America

- Marlians
- Guadeloups

**Total** | 129,010

**François Arago**

**St. Pierre and Miquelon**

**Total** | 17,399

The naval forces of France amounted to 1,717,115,190 francs (about 65,686,000). The expenditure of 1,737,115,171 francs, the expenditure thus exceeding the income by 19,986,000 francs.

In 1856, the whole army of France amounted to 677,500 men, of whom 310,374 were in France, 64,325 in Africa, 197,597 not then returned from the Russian war in the East, and 3,007 in Italy.

In 1867, the total number of vessels comprising the fleet of France amounted to 353, of which there were 10 of 120 guns, 50 of 100 guns, 15 of 90 guns, 6 of 80 guns, 17 of 60 guns, 17 of 50 guns, 16 of 40 guns, etc.

The constitutional monarchy and representative government which had prevailed in France under King Louis Philippe, the head of the younger branch of the Bourbons, was abolished by the revolutionary revolution of 1848. A republic in form, governed by a president and a national assembly, these powers being elected by a suffrage all but universal, succeeded.

On December 3, 1851, Prince Louis Napoleon Bonaparte, President of the Republic, issued a decree dissolving the Legislative Assembly, establishing universal suffrage (the assembly had contested the right of the people to elect 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 provisional, or rather of the president, the constitution under which France has since been governed.

According to this proclamation the President, while he retained his title, assumed more than royal authority. He is responsible to the people alone who had elected him, and to a national assembly: he holds the command of the land and sea forces, the exclusive initiative in new laws, the right to declare the state of siege, among his leading attributes. A Senate was appointed, whose number was not to exceed 150, the members being named for life by the President, who may also grant them salaries. A lower chamber, called the Legislative Body, consists of 261 members, one for every 36,000 electors, and chosen for ten years by universal suffrage, but without the ballot. The sitting of both chambers is to be private, and official reports only of the proceedings of the Senate; the President may also prevent the publication of any member of the Senate, but not to the Legislative Body. The mayor of communes are appointed by the executive.

In this draft of the constitution the name of Republic was retained for the President. On December 3, 1855, in accordance with a decree of the Senate dated November 7, 1852, and a plebiscite carried by 7,389,665 votes against 204,401, the name of the government was changed, the old Empire was re-established, and Louis Napoleon Bonaparte was appointed Emperor under the name of 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.
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 1786 at Spilsby in Lincolnshire. His ancestors were subdivided into various branches of the family in different parts of the country, 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 mainte-
nance of himself and his children. Besides the trade, he was besides the subject of this memoir, attained considerable rank and reputation. One, Sir Willingham Franklin, became judge at Madras; and another, Major James Franklin of the Bengal army, 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 traditionary evidence. When a schoolboy at Louth in Lincolnshire, he availed himself of a holiday to go 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 fond of him, and who had resolved that his son should follow any other profession than that of a sailor, conceived that by sending him in a small merchant ship to Lisbon, the discomforts of the voyage would effectually cure the lad of his love for the sea, but it had a totally different effect. Having accordingly, after a long period, he was sent on a naval profession, he was entered as midshipman on board the Polyphemus at the age of fourteen, and was in that ship in the celebrated battle of Copenhagen, from which he escaped without a wound, whilst a brother midshipman of the Kelly was killed.

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 Franklin 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-
poise. 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, while Captain Flinders proceeded to Port Jackson for relief.

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 Forster, on board the Porpoise, and embarked on board the Earl Camden, in China, and in November 1801 arrived in London 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 ship Pallas of 96 guns, Captain Lieu, and had the charge on board that ship of the signals during the memorable battle of Trafalgar. It is recorded that he performed this important duty with singular coolness and intrepidity, although many of his brother officers were shot around him. Indeed, out of forty companions, only seven, of whom he was one, came out of the battle unscathed. He now served for two years in the Channel fleet and Rochfort squadron, and then joined the Bedford, in which ship he was present at the blockade of Flushing. The Pallas joined the Bedford, and on the attack of Newhaven in 1814 acted as the gun-boat officer, 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.

In 1817 the Government was turned to Arctic discovery, which had been interrupted 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 scientific knowledge he had acquired when serving under Captain Flinders, was now of great benefit to him, and Sir Joseph Banks, who at that time presided over the Royal Society, and who took great interest in Arctic matters, re-
commended him to the Admiralty as a proper officer to be employed on that important duty. Accordingly Franklin commenced his Arctic career by commanding the Trent, which ship, with the Dorothea, commanded by Captain Buchan, formed an expedition appointed to sail from Spitze-
bergen across the supposed Polar University to the point at 80° 34' N. became disabled, but Lieutenant Franklin, with a gallant disregard of danger, earnestly requested to be allowed to proceed alone in the execution of the service. The nature of Captain Buchan's instructions prevented this, and the ships returned to England.

Franklin's conduct and aptitude for the peculiar service of Arctic enterprise brought him into prominent notice, and he was intrusted in 1818 with the command of his first over-
land expedition for the purpose of tracing the coast-line of the North American continent, at that time very imperfectly known. Descending the Coppermine River the party surveyed a large portion of the coast east of the mouth of that river, the line which was afterwards fished out of the journals and charts, and the chain of islands, which, though now complet-
ely unaffected, is undoubtedly one of the noblest pictures of heroic exertion and patient endurance ever presented for our admiration. The results of the labours of Franklin and his companion are such a monument of the memorable journey, deserve more full and fitting recognition than can be attempted on this occasion: the party travelled 5500 miles, mostly over ground previously unknown, and large acquisitions were gained for science by the careful study of the geology, physical geography and natural productions of the North American continent.

For his services on this occasion he was promoted to the rank of captain, having while absent risen from lieutenant to commander. In 1821 Franklin undertook the second and more important expedition of the Royal Society, and was intrusted on the council of that body. Undeterred by the appalling sufferings he had already undergone, Franklin, although lately united in marriage to the youngest daughter of William Forde, Esq., again voluntarily offered his services for Arctic exploration. These were accepted, and in 1825 he left England on his second land exploration. Descending the Mackenzie River, he traced the North American coast from the mouth of the Copper-
mine River to the 160th meridian. For these fresh services he was again promoted, and was elected Corresponding Member of the Institute of France.

Sir John Franklin now remained at home two years, when he was appointed to the Rainbow, and served in that ship in the Mediterranean for three years. He was chiefly employed in the Greek waters, and had the good fortune to be of con-
sequence in the delivery of the Strathaird to the Americans. His conduct was so satisfactory that he was made a consul, and was commended by Lord Glenelg as a man of sound judgment, his character being described as being a man of great integrity, and of unexemplary conduct. After a brief period of rest which followed his services in the Mediterranean, he applied to Lord Glenelg for employ-
ment under the Colonial department, and his lordship in a very complimentary manner offered him the important post of Governor of Van Diemen's Land, which he accepted, and held for seven years. During this time that colony received convicts, New South Wales having ceased to be a penal settlement. This rendered Sir John Franklin's position most onerous and difficult, and he felt none the less the importance of the situation of the colonists, that in grateful remembrance of his government, which was marked by the establishment of a college and a philosophical society, they, unsolicited, sub-
scribed 1000l. towards the expenses of a private expedition fitted out in 1834.

It might be supposed that, after so long a period of labours, the services, Sir John Franklin would have received still more recognition, particularly as he had now attained high age; but
but his wishes still pointed towards active employment, and consequently, when the Arctic expedition was contemplated, which had been promised him, he was placed in the new force under Sir John Franklin as second in command, when the Admiralty were of opinion 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 desired the commission for the north-west passage to government, which, after having been referred to the council of the Royal Society was adopted.

The expedition consisting of the Erebus and Terror, which had recently returned from a voyage of discovery in the antarctic seas, left England in May 1845. Unhappily its history and fate are still veiled in obscurity; however, we know, that everything was done to render it efficient, that the men under Sir John Franklin were men of experience and science, and the officers, chosen 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 discretionary 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 will in all probability be only a shorter piece of history, that 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 he had seen a white man in the 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 preserved by Mr. Anderson and Dr. Rae suffice to prove that Franklin's ships must have been beset within an area comprised within the 70th and 72d parallels of latitude and the 97th and 100th meridians.

Another expedition, and doubtless the last, has been sent out, however, if possible, to dissipate the 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 yacht, under the command of the distinguished arctic explorer, Captain M'Clinch doctrines. FRANZEN, FRANZ-MICHAEL, an eminent modern Swedish poet and prose-writer, was born on the 9th of February, 1772, at Uleaborg, in Finland, at that time a province of the Swedish crown. Finland, both before and since its composition, has been closely connected with Sweden, though possessed of a language of its own or an entirely different character. Runesberg, at present the head of Swedish poetical literature, is a Finn, and the first effort of Fränzen that attracted attention was his poetical eulogy on the fifteenth anniversary of the death of the poet and diplomat Fränzen, produced a commotion in the literary world of Stockholm, by the originality and vigour 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 eulogy 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, Fränzen 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 became the pupil 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, who submitted a plan for the discovery of his country in the untried past. His work was chosen Bishop of Horsnand. Still while 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 Society in England. Fränzen held it one of his chief pleasures to have represented to him in its secretary, 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 secretariaship on his elevation to the bishopric, which he held in 1847. Leign in his travels in Sweden gives an account of his meeting with Bishop Fränzen 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 Tegnécr, and Bishop Fränzen 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, a commission was appointed 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 expediency of obtaining a new poetical version of the Psalms in English. The poetical works of Fränzen were collected in five volumes, at Orebro in 1824 and subsequent years. The most successful are definitely the songs and the ceremonial poems, the songs being often sung 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 octavo volume, are of a somewhat dry simplicity, both of style and incident, approaching to a kind of archaic poetry. The 'Finsk Romanist,' however, 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 'Phosphorist' or Romantic, but as standing at a heads a third or neutral party. His poems, 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 Scharz's 'Leben Jesu.' The works of Fränzen, mentioned, have been collected under the title of 'Minnes-teckningar.' In the introductory speech before the Swedish Academy prefixed to them, the reader remarks a tone of courteous deference in speaking of Charles XIII., 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 Fränzen's character.

FRASERBURGH. [AEREBEBURGH, 11.]

FRATER. [FRAER, 11.]

FRINGILLA, a genus of Birds belonging to the order Fringillidae and the division Insectivora, the beak is straight, longer than deep, conic, and pointed; mandibles nearly equal, cutting edges entire, forming a straight comb; no feathers in the nostrils; no feathers in the frontal plumes. 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.

F. colado, the Chaffinch. [CHAFFINC.]

F. montifringilla, the Mountain Finch, Brambling, or Bramble Finch. This bird is a visitor to this country only in winter, coming to us from the north, but at different times, according to the temperature of the country from which it emigrates. They have not been known to breed in any part of this country; those kept in confinement under the most favourable circumstances have not remained as long as one year. It is not an uncommon bird in Denmark. Mr. Hewitson saw them at one place in the southern part of Norway, where they were breeding. It is described as building in fir-trees; the nest formed of moss, and lined with wool and feathers; the eggs four or five in number, white, tinged with purple and spotted with dark red, like those of a chaffinch. The call-note of this bird is a single monotonous chirp.

FRUIT. In botanical language, that part of the plant which in the early stages of its growth is called the Pustil, and which bears the fruit. It depends on the species of the plant, when the ovules by the presence of the embryo, are changed into seeds. The Style and Stigma, when they still remain, retain their names, but the Germen is called the Pericarp, the Seed is the Embryo, which have no fruit, because they are not provided with a Germin; these therefore have Naked Seed-Buds, or Ovules,
and also naked Seeds (Semen nudis); such as Consine, Opiolaeae, and Lorantianae. But there are some plants in which the germin 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 decorticata or Fructus tectus, according as the germin only appears to exist, as in Lithum, or as this is surrounded by other floral parts, as in Anemone. In this case, the fruit is called a Simple Fruit (Fructus simplex), as in Nigella; or several, a compound or Multiple Fruit (Fructus multiplices), as in Ranunculus.

Pars, the parts of the Fruit are the Pericarp, the Spermophore, the Funiculus, and the Pulp.

The Pericarp is the transformed germin; 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 Pulsatilla. The forms of the pericarp are exceedingly diversified, but admit of no general definition; they frequently exhibit hairs, prickles, protuberances, and membraneous spines, prominent or merely in pits in their intersepar. &c. The pericarp essentially determines the varied appearances of the fruit, by its diversity of structure. The parenchyma of the germin is developed in the Pericarp, in the mature pericarp only the epidermis of both surfaces, and between these a uniform layer of parenchyma, without vascular bundles, as in the lower Araeos, or traversed by a few simple bundles. In other cases only the epidermis of the outer surface is perceptible, and the latter is a true parenchyma, with the epidermis of the inner surface, is succulent or fleshy, as in Arora; or it may be, that under the epidermis of the outer surface some layers of cellular tissue are woody, while 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, External Cellular tissue, Sarcocarp, the middle two undistinguished coats, the Endocarp. These various structures in the fruit are most important which cause the peculiar solutions of the continuity in the fully mature 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 is united with the Spermophore, forming a compound berry-like, or the pericarp is separated into separate pieces, which do not again open, but firmly inclose the seed—Splitting Fruits (Sichincarpas), and their parts called Mericarpas. The Berry-like Fruits are also subdivided, according as the fruit, after leavelling, remains (1) the more tough and solid, and the outer more fleshy and juicy—Stone Berries (Drupe); or the reverse—True Berries (Bacca); or, lastly, all the layers appear thin and dry, or leathery (Achena). All these forms may, with the germin from which they arise, be united into superior or inferior, one or many celled, or one or many seeded; which only require to be noticed when deviations in the structure of the germin have arisen through abortion, being otherwise self-evident.

In the former there occur to the berry-like families. The mode of bursting (Dehisceo) is especially to be observed. The simplest process is an apparent wholly irregular tearing open at any place, as in Nicandra; usually however the form of the dehisce is very regular, even though it may be confused into a small part of the fruit, as in Papaver, Anthericum, &c.

The solution of continuity is either vertical or horizontal: in the latter case, the upper part forms a kind of cover upon the fruit—this is termed an operculum. In the first case, the pericarp, &c., falls away in more or fewer separate pieces, which are termed valves. In many-celled fruits the valves may separate entirely from the persistent septa, as in Coecas scabrosa (dehiscenta septifraga); or the septa may remain united, in the latter case, may form, or one of these lamellae on each of its margins (dehiscenta secpida, valvulae marginse septifera); or the septa may remain undivided, adherent to the middle of the valves (dehiscenta localisida, valvulae medio septifera). If in any of these kinds of dehisce a stalk-like mass of cellular tissue remains standing in the axis of the fruit, it is called the Columella.

From what has been said, it is sufficiently evident that these solutions of 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 carpelles have been blended, the term (dorsal suture, has been applied by some botanists to designate this line; but it is more accurate to draw the line where the margins of one and the same carpel or similar part have become blended.

In the generality of caperful fruits, the above-mentioned folds or ripples in the pericarp remain distinguishable from the other; but they are usually very thin and membraneous or leathery, or more rarely woody.

f. The Schizocarp, or Splitting Fruits, are usually distinguished chiefly according to the direction in which the clinj occurs. 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 named Coeci or Mericarpas, in the last, Fruits Queriparces, or Segments. In this case, instead of the pericarp layers, the inner of which are always hard, and often woody; while the outer are fleshy or coriaceous: both are developed in a greater thickness than usual.

g. The True Berries, predominating in the families of Gramineae, Passifloraeae, Ocuveribaeae, and the Araeos, and occurring occasionally in many other families, consist essentially on the fleshy or juicy texture of the inner layers of the pericarp, which often exist to the exclusion of the outer coats; instead of the pericarp layers, the inner of which are always hard, and often woody; while the outer are fleshy or coriaceous; both are developed in a greater thickness than usual.

h. The Stone-Berries, characteristic of the Angyralae, but also presented in other families, owe their peculiarity to the pithy texture of the inner layers of the pericarp, and the outer being reduced to a dissolution into single cells, turgid with fluid, while the external layers are solid, and sometimes even woody, as in Lagenaria.

i. The Acanthias, with always thin dry layers, not usually distinguishable, characterise the families of the Gramineae, Cyperaceae, Osypulaeae, Compositae, and Diapodaceae, predominating in the Dryposites and Ranunculaceae, and occur simply in other cases. They are one-celled and one-seeded, generally with more than one seed-pace, as in Osypulaeae, through the abortion of cells and seed-buds.

With regard to the Spermophore it may be remarked, that in the dehisce of the fruit portions of cellular tissue are separated from the valves or septa, to which the seeds are united, in two principal ways—first, by the deaths of the sep- morphes. In these separations sometimes actually independent organs become dissolved from their union with others, as in Crucea, and sometimes merely pieces of independent organs become detached, as in Astrepodaceae.

The Pulp in the fruit assumes two conditions; on the one hand it passes into the loose cellular tissue of the pericarp in the true berries, as in Solanum; and on the other into the subsequent products of the funiculus; namely, into the aril of the fruit, as in Arum, and probably into the true aril, as in Rene.

The Funiculus exhibits manifold varieties, such as hairs, warty expansions among the seeds, membraneous, continuous, or lobed envelopes of the seed (arils), and so forth.

There are often parts external to the seeds, which are persistent till after the maturation of the seed (Sam), and they often undergo many changes; and when they become fleshy they assume the appearance of fruits. They are called perigonia, or the perianth. In the Flower of the Bean (Phase), seen in the case of the fruit of the Fig (Ficus), in which the peduncle or receptacle swells up and incloses the true fruits. The pedicel in Foeniculum dulcis also swells up and assumes the form of a fruit. In the Pine-Apples (Amarnae) the perianth is fleshy, and when the scale has been partly eaten. In the Mulberry (Morus) the perianth is the fleshy part; in the Bladder- Campion (Oiscabata baccifer) the calyx enlarges; in Mirabilis it is the corolla; and the hirs of the Rose (Rosa) are
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 same kind of fruit has frequently 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', whose remarks on this subject deserve careful attention from those interested in the further development of this subject.

Enumeration of the Various Forms of Fruit.

I. Seed naked (Semem nudum).

A. Seed solitary.

B. Fructifications.

II. Simple Fruits (Fructus simplex).

A. Capsule (Capsula).
   ⊖ Superior.
   5. Cupula circumscissa.
   7. Pyxidium, No. 5. One- or many-celled, formed of several carpels: many-seeded. Ex. Nyctalis.


   11. Silique. One-celled, or many-celled, one-valved, separating from the persistent stamens, forming a Septum (Reptum). Ex. Matthiola.


   15. Capsula. One-celled or many-celled, many-seeded, dehiscing by valves or pores, Primula, Anemone.
   ⊖ Inferior.


B. Splitting Fruits (Scissocarpos).

   19. Aechmenium. In Boraginaceae, Lamiaceae.

C. Stone Fruits (Drupa).

   21. Tryma, (imagined to be) one-celled by suppression in Juglandes.

D. Berry (Baccus).

E. Closed Fruit (Achumen).
   27. Aechmenium (Auctorium), Capsula (Lindley). One-celled, one-seeded, not blended with the seed. Ex. Compositae.

   29. Carpophytis. One-celled, one-seeded (imagined to be) blended with the seed. Ex. Brassicae.


III. Multiple Fruits (Fructus multiples).

A. Several Achmen.

B. Several Berries.

IV. Fructifications (Fructus compositi).

A. Capsula. With many-seeded fleshy pedicel.


B. Spikes with fleshy bracts and perianths.
   8. Spikes with wooly bracts and perianths.

V. Spurious Fruits (Fructus spurious).


40. Pomum. Many-seeded Achemen in one circle, blended with the fleshy disc. Ex. Malus.

41. Bacalosum. Many-seeded Achemen in two circles, blended with the fleshy disc. Ex. Passiflora.

42. Decleisio. Achemen enclosed in a hardened perianth or corolla. Ex. Spinacea, Mirabilla.


FRY, MRS. ELIZABETH, was the third daughter of John Gurney, Esq., of Earlham Hall, near Norwich, an opulent merchant and banker, and a member of the Society of Friends. Elizabeth Gurney was born May 21, 1780, at Bramerton, Norfolk, near Norwich, where she was brought up, and was a summer residence; in winter they occupied a large and commodious house in Norwich. They were not ‘plain Friends,’ that is, they did not wear the plain dress of the Quakers, nor use ‘thou’ and ‘thee’ in place of the ordinary ‘you,’ nor abstain from the usual amusements of social life. They of course attended the Friends’ meeting-house at Norwich, and the monthly and quarterly and yearly meetings; but in other respects there was little distinction between them and other persons who belong to the Church of England. Mrs. Gurney died when Elizabeth was only twelve years of age, leaving seven daughters and four sons. Mrs. Gurney’s business pursuits led her into intercourse with persons of all denominations; and a warm heart, social disposition, and courteous manners introduced him to many acquaintances without as well as within the pale of the Society of Friends. The daughters, as they advanced in years, especially the three eldest, dressed gaily, and sang and danced — sometimes attending concerts and balls at Norwich, and sometimes pursuing their favourite amusements at Earlham Hall, which had then become their father’s country residence.

Elizabeth Gurney, from the age of fourteen to seventeen, was, as she herself, ‘blessed with a somewhat sceptical, and her doubts greatly disturbed her. While she was in this flattering state of mind, William Savery, an American Quaker, paid a religious visit to England, and, on the 4th of February, 1796, preached in the Friends’ meeting-house at Norwich. His discourse produced a very strong effect upon her feelings, and turned the balance of her judgment in favor of religion — a change which subsequent discourses and conversations tended strongly to confirm. She had made great progress towards becoming a ‘plain Friend,’ and instructed about seventy poor children in her father’s house at Norwich, when Joseph Fry, who, with his brother, carried on an extensive business in London, paid a visit to Mr. Gurney at Earlham Hall. While there he made an offer of marriage to Elizabeth Gurney; and on the 19th of August 1800 they were married in the Friends’ meeting-house in Norwich. Joseph Fry and his family belonged to the strict section of the Quakers, and Elizabeth Fry was now prepared to adopt their ways. She resided with her husband in his house of business in Mildred’s-Court, in the City of London, till the spring of 1809, when, on the death of her husband’s father, she removed to Plashet House, Essex. In 1810 she became a preacher among the Friends, and ever afterwards continued to perform with great zeal the duties of her sacred office.

In the month of February 1813 she visited the prison of Newgate in London, and saw about 300 women tried and tried, with numerous children, crowded together, without classification or employment, in rags and dirt, with no bedding, and nothing but the floor to sleep on. The season
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 oblong 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 sporocores of the lower Algae, and each with two terminal movements. The motive organs are vibratory hairs, or cilia, with two of which each little body is furnished.

The Paramenata are easily known from all other Olivaceous Sea-Weeds, by a character at once natural, and easily ascertained, the spores within 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 either pole, in the Southern, in the Strait of Magellan, and in the Antartic Ocean the order is limited to Durvillaea and to Scolithus, and to Segetolitha, a fine Alga allied to sub-tropical forms. The British species, except masses, and the abundance is but a fourth; yet from the strictly social habits of several of them, they cover more surface of tidal rocks than all the other Algae put together. It is these plants which impart the deep brown colour to the rocks exposed on the coast.

The following is a synopsis of the British genera of these plants:

**Fucus.**—Brazilian bearing ribbed leaves. Air-vessels sinuses.

**Halidrys.**—Frond linear, pinnate, leafless. Air-vessels divided into several cells by transverse partitions.

**Cystoseira.**—Root scutate. Frond much branched, bushy.

Receptacles cellular.


**Fucus.**—Root scutate. Frond dichotomous. Receptacles filled with mucus, traversed by jointed threads.

**Himanthalia.**—Root scutate. Frond cup-shaped. Receptacles (frond-like) very long, strap-shaped, dichotomously branched.

1. **Sargassum.**—Frond furnished with distinct, stalked, nerve leaves, and simple axillary stalked air-vessels. Receptacles small, linear, tuberculated, mostly in axillary clusters or racemes. Seeds in distinct cells. The generic name is from Sargar, the Spanish term for masses of sea-weed found floating in the ocean in some latitudes.

2. **S. vulgaris.**

3. **S. boaeforum**, though both of them have been found cast on our shores, have no claim to a place in our British flora, being natives of the tropics, occasionally driven, with other tropical productions, by the force of the westerly currents on our Atlantic coasts. The species of this genus are found over a wide extent of ocean, and have been generally considered as tropical. They appear like floating meadows in the midst of the sea, sometimes probably support a larger number of living creatures than the most productive pasture in Great Britain. Myriads of Molluscs, Batoids, 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. **Halidrys** has compressed linear fronds, pinnated with distinct branches. The air-vessels are lanceolate, stalked, divided into several cells by transverse partitions. The receptacles are entire, stalked, cellular, pierced by numerous pores, which communicate with immersed spherical conceptacles.

**H. silicicola** has linear very narrow branches, compressed linear lanceolate air-vessels, slightly constricted at the septa, prolonged upwards on rocks and stones in the sea, at and below half-tide level.

III. **Cystoseira** has a 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 sack, and a chain.
C. ericoides has a thick woody short stem, cylindrical, and beset with numerous slender filiform branches, variously divided, and densely clothed with small spine-like awl-shaped ramuli (or leaves). It is found on rocks in the sea, and has the peculiar property of being able to exist 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. cozumelensis, and C. ambigua. The last is a species of rock-springs. It seems difficult to determine as to the duration of this plant. Some botanists consider it as 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 thongs are often used in the nipa huts, and sewed to the rocks 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-Thanoge. The fruit consists of tubercles immersed in the thongs, and these tubercles 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 nucleus of the plant discharged in the death-stegule which goes on, when, torn from the rock and tossed about by the waves, it lies withering in the open air. Dr. Neill mentions that in the north of Scotland a kind of sauce for fish or fowl, resembling ketchup, is made from the cup-like or fungus-like thongs of the plant.

P. tuberculatus is found in rock-pools, on the recess of the tide, near low-water mark. It is better known by the name of Puccus tuberculatus. It is very different in many respects from Puccus proper. When dry it becomes very brittle and black.

V. Fucus has a plane, compressed, or cylindrical frond, linear, dichotomous, coriaceus. The air-vessels, when present, areinate in the frond, simple and large. The receptacles terminal, cellular, pierced by numerous spores, which communicate with immersed spherical receptacles, containing the lower part of the receptacles parietal simple spores, and in the upper tufted anthelia. The name is from two Greek words, signifying [unreadable word].

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V. Fucus has a plane, compressed, or cylindrical frond, linear, dichotomous, coriaceus. The air-vessels, when present, areinate in the frond, simple and large. The receptacles terminal (except in Fuccus nodosus), turgid, containing the lower part of the receptacles parietal simple spores, and in the upper tufted anthelia. The name is from two Greek words, signifying [unreadable word].

VI. Himanthalia has coriaceous orbicular top-shaped fronds. Very long strap-shaped receptacles, repeatedly forked, springing from the centre of the frond, and traversed by jointed fibres, and pierced by numerous pores, which communicate with immersed spherical receptacles, containing either parietal spores or antheridia.

H. lorica is a rock-spring species. It seems difficult to determine as to the duration of this plant. Some botanists consider it as 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 thongs which are produced are sometimes 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-Thanoge. The fruit consists of tubercles immersed in the thongs, and these tubercles 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 nucleus of the plant discharged in the death-stegule which goes on, when, torn from the rock and tossed about by the waves, it lies withering in the open air. Dr. Neill mentions that in the north of Scotland a kind of sauce for fish or fowl, resembling ketchup, is made from the cup-like or fungus-like thongs of the plant.

FUCHSITE, a Green Mica from the Zillerthal, containing 8 per cent. of chromium. From the crystallization of mica two additions, specious hydroxy, from 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, but and one axis of perfect prismatic faces. This last face is straight while the second is bent at an angle to form a regular hexagonal prism. This species is properly distinguished, and has been called Hexagonal Mica.

FULLER, SARAH MARGARET, MARCHIONESS OSSOLI, was born at Cambridge-Port, Massachusetts, United States of North America, May 23, 1810. Her father was solicitor and a member of the Congress, perceiving her early aptitude, had her so highly educated that he was accustomed to speak of her while quite a child as knowing more Greek and Latin than half the professors, while she herself said 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 overwrought nervous system, was a somnambulist, very near-sighted, and badly obstinate, yet through those defects an incisively dogmatic, and unquestionably well as cultivated person. The sudden death of her father in September 1835, threw upon her domestic duties and obligations to which she felt herself infinitely unequal.

She became a teacher at Boston of Latin, French, German, and Italian, then 'Lady Superior' of a school at Providence, Rhode Island, afterwards united herself for a while to that singular social or Fourieristic Society the 'Brook Farm Community,' and eventually took up her pen as a means of support. She had already become well known as a writer in the periodicals when she in 1839 published a translation of 'Eckermann's Conversations with Goethe.' Having acquired great celebrity in the literary circles of Boston, especially among the transcendentalists of that learned city, for her conversational talents as well as for her critical acumen, it was proposed to turn her powers that way to account, by forming under her guidance 'conversational classes' of the ladies of Boston. The scheme, odd as it may seem, met with acceptance. Five-and-twenty "of the most agreeable and intelligent women to be found in Boston and in its neighborhood" met at stated seasons to converse—the conversation being of course mainly on the side of the learned professions, and of the sciences, of the arts, of the heavens and earth; the will (Jupiter); the celestial inspiration of genius, perception, and transmission of diviné law (Apollo), and such other recondite themes as might be brought to the table, and which were conveyed upwards to the head of Psyche, and so forth; with poetry, music, the pictorial arts, the "thought that lies at the bottom of the different dances," and other more sublunary topics.

When Mr. Emerson storted his 'Dial' in 1840, Miss Fuller was one of the most prominent of his band of philosophers.
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contributors; and she wrote for it many very clever articles on
the 'Fine Arts,' &c., some of which were subsequently repub-
lished as pamphlets. A biographical sketch of her, written as late as
1844, under the title of 'Summer on the Lakes,' an account of a summer tour. On the discontinuance of the
'Dial,' she removed to New York, and was installed direc-
tor of the literary department of the 'New York Tribune.' It
was not, however, for her literary or political views, nor for her
social philosophy; and she gave utterance to her impressions of
the wrongs of her sex in 'Woman in the Nineteenth Cen-
tury,' a work which excited some attention in England as
well as in America. She also published the collection of
romances and fables and her refuted the charges of
both of these works were, we believe, 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 in-
tructions to the study of the literary notabilities, whom she
describes and criticizes 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 place she had consented least to visit, and thither she
next proceeded—little dreaming to what a strange conclusion all
her theories of woman's rights and claims and missions
would there be brought.
For a brief space she revelled in the enjoyment of the scenery, the climate, and the boundless freedom which her region must bestow upon her; and that a portion of her time was occupied in rendering herself
conscious by her open and resolute, though somewhat im-
prudent avowal of extreme democratic opinions, and inter-
connected with persons obnoxious to the authorities on account of
the principles of the 'Dial.' In some of her letters she clearly,
involved herself in an affair of a very different though not less ex-
icating nature. She met by accident at Vespiers, in St. Peter's,
Rome, while separated from her friends by the crowd, a young
man of extraordinary beauty whose behavior with her charmed her;
an intimacy ensued, 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 easy and gentlemanly manner, was in her hand. Ososi, 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 con-
cealed; and to this she submitted. They were married on
December 27, 1846. This, when published in London, and
thought, as it seemed, to bear communications 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 shrank 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 or danger, and with much judgment as well as the
greatest kindness in her self-imposed task. The fall of the
republic compelled her to leave Rome; and with her hus-
bond and her child, she, after staying the winter at Florence,
embarked at Leghorn in May 1850, on board the Elizabeth,
for America. From the first the voyage was unpropitious;
the captain died soon after the ship sailed; the weather
was throughout stormy; and though the vessel reached the
Atlantic, she came only to be wrecked there, having
struck on Fire Island, Long Island, in the night of 16th, 1850.
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
that.

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 connec-
tion 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
not a member of the great free thinkers, but she was able to
considerable attainments, but she had thoroughly studied a
single subject, and her writings are all disfigured by dogma-
ticism, assumption, and self-reference. In them you often
come upon a striking and apparently original thought; but if
you closely examine them, you will find yourself in the
position of studying a political pamphlet, disfigured, how-
soever its uncommonness mainly to peculiarity of expres-
sion: and sometimes these peculiarities degenerate into gen-
tericness. Had her life been spared however there can be
little doubt that what was strange, and almost repulsive in
her earlier manner, would have disappeared, and the better
and lovelier part of her character and intellect have revealed
itself. The severe mental discipline she had undergone in
Rome had, as she said in one or more of her letters, subdued
her pride; and with humility came in all the gentler virtues
and intellectual graces. Nothing could be more grateful
and beautiful than her conduct as a woman, a wife, and a mother
under her marriage trials, and during and after the siege of
Rome; and the letters which she wrote then are more graceful
and eloquent than perhaps anything else which has fallen
from her pen. She wrote an account of the Roman
revolution, the progress and suppression of which she had
watched so eagerly, but the manuscript perished with her.
(Memoirs of Margaret Fuller Ososi, compiled by her
friends J. F. Clarke, R. W. Emerson, and W. H. Channing,
FUNICAMIDE. (CHEMISTRY, S. B.)
FUNGI. There is frequently considerable difficulty in distin-
guishing Fungi from Algae, on account of Cryptothecium Plantas.
They are distinguished from Lichens by their more fugitive
nature, their more succulent texture, their want of a thallus
or expansion independent of the plant that bears the repre-
sentative spore; and sometimes the mycelium of one species
isogenous distinct from the fructifying bodies of a vegetative
germ so constant in Lichens.
From some forms of Alge they differ very little, but the
most obvious distinction is their mode of growth. The
Fungi grow by means of spores, while the Alges grow on the
bodies on which they grow, which is the case with all the
Fungi. There are however certain free forms of Fungi
which it is difficult to distinguish from Alge by this char-
acter; such are the moulds which are developed in list,
milk, and other liquids.
It has been stated that Fungi are distinguished from Alge
by the absence of spontaneous movement. It is no doubt
true that the condition of the protein which is the mobile
substance of the cell in Alge, is the same in Fungi. But this
Alge, but this is no general distinction. In those Fungi
which are developed in water, in one instance at least, the
Achlya prolifera, or Saprolegnia form, the movements of the
spores are as active as in any of the Alge.
There are several other facts which are important to the
conclusion that the cells of Fungi are actuated by means of
cells of a determinant figure, the whole centre of which consists
of spores attached, often four together, to the cellular tissue,
which at length dries up, leaving a dust-like mass inter-
mixed more or less with flocs, as in the puff-ball, or
sporidia, contained in membranous tubes or sacs, like the
Theom of Lichens, as in the Sphagnum. In their most
complete state they consist of two surfaces, one of which is
even and imperforate, like the cortical layer of Lichens;
the other separated into plates or cells, and called the
hymenium, to whose component cells, which form a stem
structure, are attached, the internal and external surfaces
formed by means of little processes, and generally in four, though
occasionally the number is either less or greater." (Lindley.)
The following is Schiedlein's account of the development of the
sporangia reproduction in the Fungi:
"The most simple (Hypogymnets, flamentous Fungi) form,
at the end of the thread-like cells, narrower pro-
portions, in each of which a spore is developed: this at
length separates, having consequently a double membrane,
the cell of the spore itself and the covering (vesiculums)
arising from the parent cell, as, for instance, in *Penicillusium* and *Botrytis*. 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 others are divided spirally, as, for instance, in *Nucor* and *Penicillusium*.

In *Gasteromycetes*, the ventricular fungi the thread-like cells combine into pointed, or non-pointed, variously shaped sporocarps; in or upon which are spores, the spores being produced between the undulating edges of the spores, the thread-like cells often remain as tender as wool, and form, as in the *Trichioconis*, or as a delicate network (spilium), as, for instance, in *Stemonitis ovaria*, and the external capsule (uterus peridium) generally composed of the globules of the inner portion which burst in different regular ways, as in *Arceps* and *Geasterina*.

In the most highly developed Fungi (Hymenomycetes, membranaceous Fungi), elongated posch-like cells (probably only the ends of the interwoven film form fungus-cells, developed into the sporocarps, or cells formed at the ends of these cells) combine by arrangement side by side to form a membrane (hymenium). Some of the cells of this membrane may be enlarged considerably (sporangia), and send out from their tips thread-like extremities, in which of which a spore is developed. The film-like walls of the fungus, then either form round masses, closed in all round (sporocarp), with cavities in their interior, the walls of which are clothed by the hymenium, or they form definite spongy thalli or sponges, tubes in *Polyporus*, or lamellae in *Dolabella* and *Auricous*, 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 Todus-stools, and more especially that of the *Auricous*. In the latter it is observed that the spores appear between the excised mycelium, small hollow heads (volves), at the bottom of 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 opening is formed, the surface of which is attached the tubes, lamellae, &c. which bear the hymenium. The bottom of the cavity is only formed by a membrane (idium), which is either separated from the pedicel on its further development, or, leaving itself from it and the upper part at the same time, remains as a membranous ring (annulus) 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 (patula), and when broken through the volva, which is 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 in the same work of the same author. Fries states that he has traced no less than eight genera of different authors to mere degenerations or imperfect states of *Thelaphora* *sulphurea*. Nees von Esenbeck also states that the same species under certain conditions of cultivation as well as their differences the same species will produce Alge, Fungi, Lichens, or Mosses.

In the article *Entomptla*, S. 2, will be found an account of the plants growing on man and living animals. Many of these plants produce spores of a peculiar character, and maintain that according to different circumstances the same species will produce Alge, Fungi, Lichens, or Mosses.

The attacks of Parasitic Fungi cause extensive injury and disease in plants. Some very fat, and maintains that the spores of *Penicilliium* coming into contact with the plant act both as the predisposing and exciting cause of disease; others, perhaps more correctly, think that some change first is produced in the cells of the plant, which enables the spores to find a nidus, and to develop without injury to the plant. The blackened variety of *Nucor* always floats in the soil, and becomes a special 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 then a peculiar character to the disease. Many of the diseases of cultivated crops are attributed to Fungi. The spores of Fungi are very minute, and are constantly floating in the air. They can easily be applied to the surfaces of plants. When 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 fruit. The specific constitution of the spores is the same in the stalk, the spore, and the fruit. Different species are restricted to different plants, and even to different parts of the same plant. The forms which the same fungus assumes seem to vary sometimes according to the kind of host which it grows. The disease called Blue, Smut-Bole, or Pepper-Bole, is occasioned by a culture *Uredo carvis* by De Candolle, and *Uredo festata* 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 black, which burst, the spores being scattered in different regular ways, as in *Arceps* and *Geasterina*.

It is the most highly developed Fungi (Hymenomycetes, membranaceous Fungi), that penetrate the sporocarps, or cells formed at the ends of these cells; (probably only the tips of the interwoven film form fungus-cells, developed into the sporocarps, or cells formed at the ends of these cells) combine by arrangement side by side to form a membrane (hymenium). Some of the cells of this membrane may be enlarged considerably (sporangia), and send out from their tips thread-like extremities, in which of which a spore is developed. The film-like walls of the fungus, then either form round masses, closed in all round (sporocarp), with cavities in their interior, the walls of which are clothed by the hymenium, or they form definite spongy thalli or sponges, tubes in *Polyporus*, or lamellae in *Dolabella* and *Auricous*, 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 Todus-stools, and more especially that of the *Auricous*. In the latter it is observed that the spores appear between the excised mycelium, small hollow heads (volves), at the bottom of 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 opening is formed, the surface of which is attached the tubes, lamellae, &c. which bear the hymenium. The bottom of the cavity is only formed by a membrane (idium), which is either separated from the pedicel on its further development, or, leaving itself from it and the upper part at the same time, remains as a membranous ring (annulus) 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 (patula), and when broken through the volva, which is very soon dissolved.

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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 sticky exudation from the flour. When wheat is dried thoroughly, it has been considered useful to add some alkaline ley to the water in which they are washed. The alkali unites with the oil and forms a soapy matter. Lime has been used, but for the same reason as described above, containing ammonia, and the liquid from stable dung have also been employed; other matters, as sulphate of copper, act by destroying the vegetating powers of the Fungi.

Mr. Ellis, of Barning, Kent, says that the invariable practice of storing wheat in blackest wheat 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 and immersed in the warm water, 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 the wheat taken out of the water as soon as properly wetted. Mr. Ellis tried an experiment on a bushel of the 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 which was exposed to the influence of the black eye, and killed off, of every 100, while that dipped in boiling water and limed had not a black ear in several thousands which were examined. Many other species of Uredo as well as Ustilago grains, the spores of which are disseminated in the field, receive their names from the plants on which they parasitize, or from the situation in which it grows. Ustilago Maydis, a maize smut, is a fungus which gives rise to protuberances on different parts of the maize. The stem, upper leaves, and especially the bracts become immensely swollen when attacked by this disease, and the ovaries, ovules, and male blossoms are not exempt. The part affected are at first white tinged with red, smooth and juicy. The cellular tissue increases in size, is devoured by the spores, and is succeeded by rae 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 multitude of dark dust mixed with irregular threads. Ustilago vittata causes disease in grasses in India. The spores are black and round, and the disease they occasion is denominated Graminis, or Black-river disease. In France, according to Leveille, the immense quantity of black dust resulting from it in the hay-fields of France, produces injurious effects on the haymakers. A species of Deppezia or Septoria sometimes occurs in the grains in the knots of wheat. Various species of Erysiphe, such as E. hordei, E. graminis, E. aduncus, and E. bicolor give rise to kinds of mildew. Erysiphe are often met with in common pea crops. Some say that Oidiurns are merely particular states of Erysiphe. The plant producing mildew in the vine is the Oidium Tuckeri of Berkeley. Other species of Oidium probably cause mildew in the peach, rose, hop, pea, and onion. For destroying the mildew in vines 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 Rhizostoma Malti 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 entire diseased ovary protrudes in a curved form resembling a cock's sparrow, hence the name from the French 'erget,' meaning a spur. The ovary is black externally, spogy internally, and contains much oily matter. Some consider it as produced by the attack of a fungus, which destroys the ovary, and replaces it by a large ovarian sack. The disease is usually met with in rye, and the name of spurred rye is applied to it. It sometimes occurs in wheat and in barley, and it has also been noticed in Lolium perenne, Lamium album, Arabis, Atriplex, Triticum, Dactylis glomerata, Anthoxanthum, Pulsatilla arundinacea, and Alpecoeca 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 discovered in the uninregnated ovule of rye, for although extremely diluted by the stamens and rendered deficient 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, imitating in this respect the ovary of an egg, which fertilization has replaced the seed. The solid mass which has been called Sclerotium clavus by Deppezi, and the filamentous portion called Sphaecelca by Leveille and Feé, and Erypsios spicant, is only, properly speaking, organs of vegetation. The fungus destined to grow from this apparatus is an elegant Sphaeria, probably that called by Fries Cordyceps purpurea. This plant has been seen by Schumacher in diseased cereals, and it has been detected by Boussell in Sclerotin in Blattis, in which the Sphaeria is the casey camalgamos, and by Dumeril in Ergot of Rye. Tulasne has shown that this Cordyceps is produced from the Ergot when it is allowed to vegetate. Ergot of Grasses and Ergot of Cupressaceae, 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 Tesser 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 stony land.

The disease which has recently attacked the Potato in various parts of the world is by many attributed to the attack of a species of black eye, but by Berkeley, who describes the fungus as Botrytis 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 produced by certain poisonous gasses, 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 mould, which ran its course in a few hours; and from the rapidity of the action, the period for examination of the leaves has often passed over. The fungus generated does not live on decayed or decaying matter, but is one which produces decay, and renders the plants unsafe for use. The compact mass of mycelium prevents the elaboration of the spores in the leaves, obstructing the admission of air and the emission of transpired fluids. The stem is thus overcharged with moisture, and ultimately rots, while every source of nutriment is cut off from the half-rotten tubers. The atmospheric changes during the late disease made the fungus spread rapidly.

While there is no doubt that the Botrytis is developed in the progress of the Potato disease, the question arises whether the decomposing mixture is not produced or produced by a Fungus which is itself most consonant with the phenomena is, 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 ailments in which the appearance of the disease is assumed as the Botrytis, 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 1868, Haring 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 tissue, in which were agglomerated grains of starch, and finally parasitic organisms appeared in the cavities. The vegetable parasite developed were Polyza obs, Fumiporos Solani, F. difformis, F. caudinum, and Oidium violaceum. When the disease had advanced in the tubers, the spores were present in the digestive passages. The vegetable parasites were present in the tissue, in which they formed the starch, which is the food of the fungus of the potato disease. He says that decaying organic 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; this admits the fungus to enter, after an inadmissible struggle between vital and chemical forces, and induces decomposition by a process of fermentation. The azotised 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 gluten decreased from 9.34 in the sound potato to 0.2 in the diseased one; 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 potato; that if a half putrid potato cut up into pieces is placed in water with portions of fresh potatoes, and allowed to stand till the cells of the fresh portions begin to be easily separable. It is also formed, though more slowly, when fresh potatoes cut up into slices are placed in water; the fresh 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 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 it furnishes 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 shows that this portion can be removed by a force 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 inside, the outer portion being simultaneously permeated by the ferment to the innermost 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 this also the cellulose, so to speak, is not the starch, 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 one of the symptoms, which is produced by 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 spores 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.

"Liebig attributed the Potato disease to diminished or suppressed transpiration, depending upon the hygroscopic state of the roots, which is occasioned by the precipitating of the moisture in regard to the Hop blight, 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 potatoes, where the leaves are suddenly covered 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 potatoes. The vessels and cells became charged with fluids; and, owing to the checked transpiration, there was stagnation of the sap and death.

"Fungi and putrefaction are, according to him, the consequences of the death of the plant. Klootsch proposes to check the Potato disease by pinching off the extremes 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 two or three times, so that it shall be as if the plant were cut to the stem and branches, he thinks, will direct the nutrient matters in the direction of the increase and multiplication of subterranean as well as aerial branches. This leads to increased development of tuber, and strengthens the leaf and stalks. Professor Lamb of Oxford, on the contrary, has saved potatoes from disease by cutting off the stems after flowering with a very sharp knife, 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 flowers had faded, in order that the young tubers might not be 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 humid or dry atmosphere, in which the decomposition takes place in the cellulose and in the contents of the cells, which speedily leads to decay; that parasitic Fungi find a nidus in the decaying organic matter, so as to enable them more readily to infect the disease; and that, as yet, no remedy has been devised.

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 inhabitants. Among them are not more than half 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. [Astraeus.] Dr. Rude in his book on "Excellen Funguses of England," gives descriptions and drawings of the following species of British Fungi as those which may be used as food:—


The other species of Fungi that have sometimes been employed in medicine, are mentioned in a previous article. A fungus which is used in the South of France is called the Acrepus peronatus, A species sold in Covent Garden under the name of Brieuets, and which writers agree in regarding as perfectly free from danger.

The poisonous principles produced in the Fungi have sometimes been employed in medicine, an 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 inebriating property, which is employed in the manufacture of an inebriant. The following is the account of Landegord, 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 our opium, namely, in the form of tinctures and preparations. Such Fungi are found most plentifully about Wissana, Kamtchatka, and Willowa Derecos, 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-coloured specimens thickly covered with warts are also said to be more powerful than those of a larger size and paler colours. The usual mode of preparing the fungus is to roll it up like a bolus and swallow it without chewing, which the Kamtchatkadens say would disorder the stomach. It is sometimes eaten fresh in soups and other cookeries, 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 two small Fungi are a common dose to produce a pleasant intoxication for a whole day, particularly if water be drunk after it, which augments the intoxicating property. 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, in a word, the digestive system is 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 summary, and this is the result of the plant's habit cannot keep silence or secrets, and one fond of music is perpetually singing. The most singular effect of the Amianthus is the influence it possesses over the urine. It is said that from time immemorial the inhabitants have known that the flower imparts an interesting quality to that secretion, which continues for a considerable time after taking it. For instance, a man moderately intoxicated to-day will by the next morning have slept himself sober, but (as is the custom) the smell of his urine will be more powerfully intoxicated than it was the preceding day. It is therefore 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 carried with it, being forced upwards, so that the partials of it, has its urine similarly affected. Thus, with a very few Amianthus a party of drunkards may keep up their debauch for a week.

Dr. Langdorff 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 the appearance of an enchanted castle. An agaricus gardineri, which grows on the palm of Brazil, is a considerable. The same phenomenon has been observed in A. olivarius in the south of Europe, and in two species of Fungi at Swan River. Dr. Hooker describes plates of these fungi growing upon decaying wood in the forests of the Sikkim Himalaya.

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, this has been the result; but 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 the cause of the growth of the plant. The following substances were found by Fungi: 1. Water; 2. Cellulose; 3. Nitrogenous Substances; 4. Fatty Matters; 5. Sugar; 6. Volatile Matter; 7. Sulphur; 8. Salt; containing Siles and Potash. These substances are analogous to the ordinary products of the decomposition of water, ammonia, and carbonic acid gas by oxidation, and must either be formed by that process in the fungus itself, or taken directly up from the substances on which they grow, by absorption.

A curious fact 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 in these bodies, described as a plant, under the name of Saccharomycete Cells. During the preparation of the containing of, as now carried on at Belfast, Professor Allman has observed present cells resembling those of Saccharomycete. Whether these are true plant-cells or not, they 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 vegetative reproduction of—I mean viscous fermentation. We have here a fluid in which the constituents are, turbinin, and inorganic matter, as a yeast, are present. At a certain temperature, which is perhaps necessary to the chemical activity of the nucleus, there originates, without, as it appears, the influence of a true cell-forming power (the origin of the so-called fermentation-fungus), and it appears that it is only the vegetation of these cells which produces the peculiar changes that occur in the fluid. Which, in its opinion, is really a fungus, is a matter of indifference; but whether it is alone, 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. 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, showed a few large 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 carbonic acid gas. On the fourth day fermentation was very active. At the bottom of the vessel and on the surface of the fluid, yeast cells were seen, and a single yeast spot; but whether hollow, or a solid nucleus, I could not decide. The remaining parts appeared entirely homogeneous, yellowish or a nitrous substance, sometimes mixed with small solid granules. In a similar way, a solution of sugar with elder-flowers was examined, and the similar results. Other results were obtained in the following way:—Pure 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 porcine granules of yeast, were formed, and whilst the sharply angular aspect, assumed partly a granular aspect, and some a more or less rounded form. These glories showed an active molecular movement, and some appeared strongly stained with violet. After the third day, no yeast cells were formed, but a few granules round or elongated 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 produced, and the fluid 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, resembling those 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, but the vegetable formation preceded. There appears to be two very different types of ferment-cells, according as the fluid contains organic acids and essential oils, or not. From the phenomena exhibited by the ferment-cells, it is naturally supposed that they may be referred to regard them as ordinary cells, which are formed through a cavity in the cytoplasm, and which afford indications of the nuclei in their highest development. But this analogy is not tenable, and the above observations must be regarded as imperfect. If we take the ferment-cells, and consider them as formed of alcohol, or caustic alkalies, there will be found in the fluid a number of globular delicate cells, with thin but clearly distinguishable walls, which contain a clear fluid, with here and there very small granules, which, alone or in groups, are attached to the inner surface of the cell-wall, and (almost) always a large round flat body (a cytoplasm)."

The following arrangement of the Fungi is given in Lindley's 'Vegetable Kingdom'.

Hymenomycetes, or Agaricae.
Gasteromycetes, or Lycoperdaceae.
Conylomycetes, or Ustilaginales.
Hyphomycetes, or Myceliales.
Sporidia, or Sporocarps.
Bolbitophyceae, or Phycomycetes.
Phycomycetes, or Bryophyta.
Opisthogonata, or Tracheophtyllum.

Fusel oil. (Chemistry, & c.)
When the German parliament was assembled at Frankfort for the purpose of forming a confederation of the smaller states under a central government, Heinrich von Gagern (son of the above Baron) was appointed president, May 19, 1848; and on the 30th of June, when his first term of office expired, he was re-elected. On the 18th of December he resigned the presidency of the assembly, and Eduard Hamon of Koblenz was chosen his successor; but in March, 1849, Baron von Gagern being nominated by the Regent of the Empire to the offices of Minister of Foreign Affairs and President of the Council of Ministers. After many discussions it was decided that, as the military constitution of Bavaria constituted an Empire, and that the imperial dignity should be offered to the King of Prussia. The offer was accordingly made, and negotiations between the parliament and the king continued for some time; but the king ultimately refused to accept the compromise proposed, and the assembly was dissolved without producing any result.

GALBA [Balestrini].
GALE, SWEET. [Myrosa, S. L.]
Galeocerdo. [Sepalidae.]
Galeus. [Squalidae.]
Gallaudet, Rev. Thomas Hopkins, to whom America is indebted for the introduction of instruction for the deaf and dumb in this country. December 10, 1877.
Hanging passed through Yale College, on the 17th of March, 1833, to prevent the study of the law; but being forced to abandon it, in consequence of ill-health, he engaged for a while in commercial pursuits; then, in 1814, he entered the theological seminary at Andover, and, being licensed to preach, was chosen pastor of a congregational church at Portsmouth, New Hampshire. While thus occupied he became much interested in a little deaf and dumb girl, Alice Cogswell, the daughter of a friend, and he was induced to attempt to instruct her. In this he was by great patience very successful, and his father, Dr. Cogswell of Hartford, was incited by the great benefit which his child had derived, to earnest efforts to extend the blessings of education to other children suffering under similar deprivation. An association was formed, and funds being provided, a requisition was made to Mr. Gallaudet to resign his ministry, and proceed to Europe for the purpose of learning the system and organisation of the existing deaf and dumb institutions.

After some hesitation, caused by a reluctance to separate from his flock, he accepted the offer; and in May 1816 embarked on his mission. He first addressed himself to the London Deaf and Dumb Asylum, but after considerable correspondence he was refused admission to the asylum, except as ordinary visitor. The University and the Bibliothèque have however a marked Florentine character. The architect constantly uses the arch-headed window, divided into two lights by a centre- column, and avoids the characteristics of the late Italian styles,—whilst ornament of original character is freely introduced. But there, while the committee and master showed every sympathy with him, and would have been glad to assist him in his excellent object, there was an obstacle which it was found impossible to surmount. The teacher had learnt his system from the Masons. Bridewell [Bridewell, Thomas], and found impossible to disseminate it.
to impart the method to any one person intending to become a teacher.

Thus baffled, Gallaudet was compelled to try Paris. Here he met an Abbé Sicard, and a warm welcome. Everybody was freely open to him, 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 Leonidas Clarke, who had been the private teacher of the pupils, and was then one of the most valued teachers of the institution (he had 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 as president, and Leonidas Clarke as his head assistant, and on the 15th of April, 1817, "The American Asylum for the Deaf and Dumb," at Hartford, Connecticut, was formally opened.

The first pupil at the decisive head of the asylum until 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 preeminent." 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 impart the idea of much as knowledge as possible, 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 a remarkable 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 zealously advocated the adoption of means of imparting moral and religious training to prisoners; and he was an earnest proponent of the movement for improving the management of the insane. His last effort on this line of thought, but feeble health, he accepted in 1838 the office of chaplain of the state prison, "Retreat for the Insane," at Hartford; where it is stated, "the experience of each successive year furnished accumulating evidence of the usefulness of his labours, and the efficacy of kind moral treatment, and a wise religious influence in the mellioration 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 Mr. Clarke, had drawn from the great body of their deaf-mutes in America, as a testimonial of their gratitude, a 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 deaf-mutes urged that a more 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 the 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 journals. He also wrote a number 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.

(Garnand, *Tribute to Gallaudet*, 8vo, Hartford, U.S., 1852.)

**GALLE, POINT DE**, a town, port, and harbour on the south coast of the island of Ceylon, 75 miles S. by E. from Colombo, is situated in 5° 1' N. lat., 80° 16' E. long. The town is surrounded by a lovely circumference, and is situated at the Point de Galle. The harbour is formed between the 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 rocks in it, a pilot is required to navigate it. A good anchorage, which is about the town is sheltered in the fathom's 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-vessels, having at the port chiefly to take in coals has caused various proposals to be made for improving the harbour, 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 petiah, inhabited by natives, is exclusively a native place, and has a large population. There are 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 is 209 ft.; the lighthouse is 90 ft. high, and the letters, &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 fifteen days.

**GALLIONELLA [MELONIER, S. R.]**

**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-Grandes, in 10° 36' N. lat., 11° 18' W. long., in a valley surrounded by mountains. The river flows first east and then north until it reaches 13° 22' N. lat., whence 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., where it turns W. or W.N.W., and then S.W. to the sea, which it enters in 13° 30' N. lat., 16° 40' W. long. The Gambia has many afflictions, especially in the upper part of its course. The most remarkable on the right bank are the Ba Creek, the Neocalaba, the Niarico, the Nieko, the Jasur i, the Gular, the Armitara, the Gouna, the Port, the Jalista, and the Eropina, 45 miles below where the Gambia throws off a considerable branch named the Casmans, which by numerous channels flows into the St. Domingo. The width between Cape St. Marie and the island of Sangooma is 300 miles. On the left bank lie the rivers flowing from above the Rock of Barraconda, which has generally been considered to be 400 miles above Bathurst. The governor's party included Mr. Bage, the colonial engineer, Staff-Surgeon Kehoe, and Lieutenant Mostyn; they proceeded on small boats, accompanied by a canoes. In their progress they observed few signs of cultivation or of inhabitants along the banks. Near the junction of the Niarico the inhabitants of a town called Jallacosta waited upon the governor, soliciting the visits of the English; and the inhabitants of the trading station of Tattoo had been beneficially exercised in sabating the violence of intestine strife among the native tribes in the interior, and cultivating commercial intercourse, thereby promoting agricultural and industrial, and fostering conciliatory feelings amongst the natives. The latter was urged by the government to engage in, and Staff-Surgeon Kehoe vaccination has been brought into very extensive adoption among the native tribes on the Gambia.

The English have trading establishments at intervals along both banks of this river for many miles into the interior. The whole of the establishments are included under the title of the Gambia Colony. The colonial revenue for 1851 was £414. The exports from the Gambia are African tea, ship- timber, ivory, nutmegs, ivory hides, gum, sugar, tobacco, and hemp-wax. The values of the exports in 1851 amounted to £16,404, of the imports to 107,011. In 1852 the exports amounted to £17,806, the imports to 110,174. The number of vessels arriving at the colony during 1852 was 386, tonnage 29,274, of which 31 ships of 500 tons were British. The number and tonnage of ships cleared outwards during 1852 were:—Ships 260, tonnage 30,188, of which 30 ships of 4994 tons were British. The number and tonnage of vessels arriving at the colony during the first quarter of 1853 were:—Under 50 tons 49 vessels, tonnage 923; above 50 tons 14 vessels, tonnage 1270. Of the amount of exports for 1851 (186,404) the article of ground-nuts alone furnished 133,131l. value. The quantity of ground-nuts imported into the colony is extraordinary, and is annually increasing. On the 31st December 1853 were:—Under 50 tons 49 vessels, tonnage 923; above 50 tons 14 vessels, tonnage 1270. Of the amount of exports for 1851 (186,404) the article of ground-nuts alone furnished 133,131l. value. The quantity of ground-nuts imported into the colony is extraordinary, and is annually increasing. On the 31st December 1853 were:—Under 50 tons 49 vessels, tonnage 923; above 50 tons 14 vessels, tonnage 1270. Of the amount of exports for 1851 (186,404) the article of ground-nuts alone furnished 133,131l. value. The quantity of ground-nuts imported into the colony is extraordinary, and is annually increasing.
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 'tilliebunks,' or men from the east. They are posted as usual in the locality called at Bathurst, on the island of St. Mary, at the mouth of the 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 constant service in the sudden depopulation of 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 decay in 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 more than 12 or 14 feet above high-water mark. Many 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 small. The European residents number about 50, but the number of European and American sailors and others visiting Bathurst every year is little short of 1900. There is a Roman Catholic chapel, capable of accommodating 600 persons, but no suitable place of worship for Protestants. The climate at any time is invigorating, and the health of those who frequent its shores is generally good. In the year 1871 the island was visited by from 24 miles in length, and stretches along the shore of the Atlantic, with an elevation above the sea varying from 50 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 colony.

The population of Gambia Colony, according to the census taken March 31st 1851 was 5693, as follows:—

<table>
<thead>
<tr>
<th></th>
<th>White Males</th>
<th>White Females</th>
<th>Coloured Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Island of St. Mary</td>
<td>167</td>
<td>13</td>
<td>2192</td>
</tr>
<tr>
<td>MacCarthy's Island</td>
<td>8</td>
<td>0</td>
<td>637</td>
</tr>
<tr>
<td>Barra Point</td>
<td>1</td>
<td>0</td>
<td>121</td>
</tr>
<tr>
<td>Cape St. Mary</td>
<td>1</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>14</td>
<td>2996</td>
</tr>
</tbody>
</table>

Of the total population 82 were returned as engaged in agriculture, 320 in manufactures, and 278 in commerce.

MacCarthy's Island, the Janjan Bay of the natives, has an area of about 3 square miles, and is 150 miles from the mouth of the river, following its windings, in a populous district, 60 miles below the falls of Barracunda, up to which spot the river is navigable for vessels of 50 tons burden. Fort Gunjur, on the site of the town of that name, is the best fortified post on the coast. Like St. Mary Island, it is but little raised 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 Point. The total number of scholars is about 600. The Roman Catholics have a school at Bathurst under the care of several Sisters of Charity.

GAME LAWS. Hares are no longer game, in the sense of being necessary to take out a certificate to kill them (11 & 13 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 a 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 is defined in the 25th Henry VIII., as a tacit confession that the company engaged therein do, in general, exceed the bounds of their respective fortunes; and therefore they are to determine upon whom the ruin shall at present fall. It is a thing that the law may not have been made for. In this light, it is an offence not of the most alarming character, but by 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 destruction of many of the most respectable families, an abandoned profession of every principle of honour 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 to all gentlemen the games of tennis, tables, cards, dice, bowls, and other unlawful diversions, such as lotteries in the fields, slide-thrift, or above-groat, cloysh-cayls, half-bowl, and cotting, unless in the time of Christmas, under penal pains and imprisonment. By the statute 19 Car. II. c. 7, it was next enacted, that if any person by playing or betting lost more than 100l. at one time, he was not compelled to pay the same; and the winner forfeited the value, one moiety to the king, the other to the informer. By the statute 19 & 20 Hen. VIII., it is further enacted that, the owner of the property or estate, the receiver of money won at play, or any person having any property or other rights, given for money won at play, or money lent at the time to play withal, shall be utterly void; that all mortgages upon the same consideration, shall endure to the use of the heir of the mortgagor; that, if any person at any time hereafter, shall at any time commit the like offence, up to the value of any person who used to recover it by action; and in case the loser did not, any other person might sue the winner for treble the sum so lost; and the plaintiff might by bill in equity examine the defence of the defendant himself, and that he had no privilege of parliament should be allowed. The statute further enacted, that if any person by cheating at play should win any money or valuable thing, or should at any time win more than 104l., he might be indicted thereupon, and that on conviction of the same crime the accused shall not only forfeit five times the value to any person who used to recover it, and in (case of cheating) should be deemed infamous, and suffer such corporal punishment as in case of willful perjury.

The effect of these and of various other statutes, 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 greatly with great advantage; the law was therefore altered by statute 6 & 7 Will. 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 effect of this enactment being, to make the present holders of such securities. Finally, by the statute 8 & 9 Vict. c. 109, 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 such playing, or in any other similar way, in any sort of pastime, exercise, shall win from any other person 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 the owner of any wagering, 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 as security for wages, is to be enforced. It also enacted that it shall not apply to any subscription, contribution, or agreement to subscribe or contribute 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 dominance), 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 40s. a day; and subjected any person
handing and using such gaming-houses to a penalty of 6s. 8d. 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 provision was also made of the rewards made by the statute 3 Geo. IV. c. 79; and now, by the statute 9 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 the punishment of the servant. A list of specious and sometimes voluntary, but not authorized, penalties, 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 bagattelle-boards, or instruments used in any game of a like kind.

During the reign of King George II, 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 each that shall erect such lotteries, and 60l. a time for the players; and by the statute 42 Geo. III. c. 119, games called little-plays are declared to be common and public nuisances, and a penalty of 200l. is imposed upon persons keeping any office or place for the purpose of a lottery or for any lottery or lottery instrument, not authorized by parliament. Public lotteries, unless by authority of Parliament, and all manner of ingenious 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 heavy penalties under several acts of parliament.

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 lawful amusements called Art-Contests, having for their object the promotion of a taste for the fine arts, and 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 proclamation of the association and its rules be submitted to and approved by of a committee of the Privy Council.

The statute 13 Geo. II. c. 19, to prevent the multiplicity 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 3 Vict. c. 6. The effect of the latter was to provide that the provisions of the statutes 33 Hen. VIII. c. 9, and 13 Geo. II. c. 19, and of the exception before mentioned in the statutes 9 & 9 Vict. c. 109, is to place all bargains relating to horse-racing on the same footing as other bargains.

"But," as observed by Blackstone, "particular descriptions will ever be lame and deficient, 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." No sooner were 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 & 17 Vict. 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 100l. or, by a penalty of 50l., or two months imprisonment; and without hard labour, for any period not exceeding six months.

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 hand-bills, or the advertising of bets, in order to increase a penalty of 50l., or two months imprisonment; and summary powers are conferred on magistrates and constables to enter and search suspected houses.

It is added here that a bankrupt is not entitled to a certificate, or the certificate if granted is void, if he has lost 20l. in any day or 500l. a year by any sort of gaming or wagering.

Gaming-houses are public nuisances, and the keeper thereof may be indicted at common law. To encourage the prosecution of such pernicious establishments, the statute 25 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 material evidence thereof. The costs of the prosecution are, in this case, allowed out of the fund for games. If two or more of the inhabitants who originated the proceedings are entitled to 10l. each. To facilitate such prosecutions, it is expressly provided that the person appearing or acting as master, or as having the care and management of any gaming-house, shall be held guilty, and also the master of the house of any 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. 109, and 17 & 18 Vict. c. 38, have still further facilitated the prosecution of this offence. The owner, occupier, or keeeper, and every person in any manner conducting the business of any common gaming-house, or advancing or furnishing money for any 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 500l., or in the discretion of the justices, be committed to the house of correction for such a term not exceeding twelve 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 ambiguity on this point, the same Act declares that the proceedings mentioned 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 the appointment of that person as a witness, shall be protected in giving evidence as to such criminal proceedings, 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 be brought before them, and to be examined as to the circumstances of such apprehension.

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 being imposed on persons obstructing the entry of constables, and the fact of such obstruction being itself made evidence of the house being a common gaming-house. To prevent persons evading punishment by pretending that the house was only open for the use of subscribers, it is sufficient to prove, in default of other evidence, that the house was used for the purpose of the vice; and he who keeps, or who allows to be kept by him or by any other, the places mentioned above, may be punished for any gaming played in the house, and the court may order the house to be searched, and the goods to be removed and sold at public auction.

(Blackstone's 'Commentaries'; Mr. Kerr's edition, vol. i. p. 188.)

CAMPSONYX. [FALCONERD.] GARAY, JA\'N\'OS, a popular modern Hungarian poet, was born in 1812, at Szegard, in the county of Tolna. He first attracted attention in 1834 by his heroic poem of 'Caster,' written in imitation of Vörösmarty's epic; and continued in reputation for some years, during which he was one of the favourite contributors to three or four of the Hungarian annuals, and gained several prizes from the societies which offer premiums for successful contributions to the Magyar drama. He gained a scanty subsistence by literary labours of less importance. "Handboox of the Hungarian Dialogues," and by editing a sort of almanac, and at one time a newspaper. In his later years, when his health was bad and he had almost lost his eyesight, he and his family were received by eminent persons in society, and had a seat in the same room as himself in the university library of Pesth, where he died after a long illness, on the 5th of November, 1853. He was a member of the Hungarian Academy. His last productions are 'Elizabeth Batori,' a play in 5 acts; 'Christina Maria,' a tale of ancient times; and 'A Page's Tale,' a collection of poems called 'The Pearls of the Balaton Lake;' and 'Saint Ladislaus," an historical poem. He was enthusiastically patriotic, and took an active part in the progress of Hungary during the Hapsburgs, and was almost looked upon as its golden age, from 1848. In his lyric poems he takes by preference national
subjects and these connected with modern improvement, such as the power of locomotion and the wonders of railways.

GARNSHTEEN. Where the debts owing to a judgment debtor are attached to answer the claim of the judgment creditor [Attachment; Attachment of Debts, § 2], the judgment debtor is called the Garnishee, a designation derived from the process of garnishing in ancient custom. In the Lord Mayor's Court of London, the Tolsey Court of Bristol, and the Borough Court of Exeter. The garnisher may be examined as to his indebtedness, he may dispute his liability, or he may pay the debts to the judgment creditor, who can effectually resist the latter if he does so. ('Common Law Procedure Act,' 1854.)

GARGANTUA. [Lancashire.]

GASES, LIQUEFACTION OF. [Chemistry, § 1.]

GASTROPODS. [Marine Molluscs.]

GAUTHERIA, a genus of Plants belonging to the natural order Ericaceae. It has a 5-angled or 5-toothed calyx, bibracteate at the base, after flowering becoming large and succulent, and covering the capsule with a baccate coating. The corolla is ovate, ventricose, with a 5-angled, rove-like, transparent at the base. There are 10 stamens, inclosed, with flat filaments; anthers bifid at the apex; lobes binate. The hypogynous scales 10, usually united at the base. The ovary half inferior. The capsule 5-celled, with a loculicidal dehiscence.

G. procumbens, Partridge-Berry, Chequer-Berry, Booberry, Mountain-Tea, is found on sterile sand and gravel in mountainous forests in the driest situations in North America. It has a horizontal woody rhizome, often a quarter of an inch in diameter. The stems are erect, reaching a height of 10 to 20 inches, with a robust calyx, high, round and somewhat downy. The leaves are scattered near the extremities of the branches, evergreen, coriaceous, shining, oval, or ovate, acute at both ends, revolute at the edge, and furnished with a few small serratures, each termi- nating in a minute gland, light green above, dull and downy below, and round downy stalks. There are two concave heart-shaped bracts. The calyx is white, cleft into 5 roundish acute segments. The corolla is white, urceolate, 5-angled, contracted at the base, the tube dilated, the limb 5-angled, obtuse, blooming on round downy stalks. There are two concave heart-shaped bracts.

G. smilacina, a plant of the same family as above, but smaller, and with less conspicuous flowers. It is found in the mountainous parts of North America, and is cultivated for its medicinal properties.

GAUDIE, HENRY. [Edinburgh.] A well-known brewer, who has made a considerable name for his ale, and is particularly noted for his skill in brewing 'tawny port' ale.

GAUSS, CARL FRIEDRICH, one of the most celebrated mathematicians of his day, was born at Brunswick, April 23, 1777. He displayed early such marked talent for the abstract sciences that the Duke of Brunswick, Charles Ferdinand, undertook the charge of the boy's education. He afterwards wrote a thesis which he maintained in 1799, before obtaining his degree of Doctor, he evinced his talent by analysing the previous methods for proving the truth of the fundamental theorems of algebra in a manner on which no one else could follow. In the same year he published his 'Demonstratio nova theorematis omnem functionem algebraicam rationalem unam variabilis in factores reales primi vel secundi gradus resolvi posse'; and in 1801 this was followed by his 'Dis- theoria motus corporum coelestium,' published at Hamburg, in 4to, in 1809; to which Professor Paucker added, in a separate pamphlet, a geometrical formula, more definitely proving the truth of the principle of the curvilinear triangulation upon which Gauss' method depends. This work 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 combinationis observationum errore parvo accנטר is' (1819) was published at Leipzig in 4to, with the supplement, issued in 1828 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 death of W. Bode, the Astronomer Royal of the Danish Academe of Sciences, the latter's place was filled by 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 'Glocke.' He was also occupied with investigations as to terrestrial or telluric 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 telluric 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 'Resultate aus dem Beobachtungen des Magnetischen Vereins in Jahre 1836, herausgegeben von C. F. Gauss and Wilhelm Weber,' published at Göttingen in 1838, in 4to, and in 1840, with an 'Atlas des Erdmagnetismus, nach den Elementen des Theorie entwirft.' In 1841 he published at Göttingen his 'Disquisi- tiones analyticae circa limites serierum infinitarum,' in 4to. His latest labours were directed to the theory of geodesy, the first essay of a series upon which he published at Göttingen in 1844, under the title of 'Untersuchungen über Gegenstande der höhern Geodesie.' In this, in a modest pride, he speaks of the trigonometrical admeasurement 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 most interesting that have appeared separately in addition to those already mentioned:—Methodus generalis circuli quadratum solvi determinandi expli- cat,' Göttingen, 1808, 4to; 'Disquisitiones generales circa superficies curvus,' Göttingen, 1826, 4to; 'Theoria residuo- rum biinquadricorum Commentatio prima,' Göttingen, 1828, 4to; 'Intensitas vis magneticae terrestrialis ad mensuram absolutam reducere ad magnitudines mensurabilem,' Göttingen, 1830.

GAY, G. [The], a poet of the Romantic school, was born at St. George's, in the department of Haute-Vienne, on December 6th, 1778. He was educated at the Polytechnic School, where his assiduity and talents gained him the friendship of Berthollet. On leaving the school he entered the scientific department of Les Ponts et Chaussees. The expansi- bility of the gasses 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...
him the use of the balloon, just previously invented, as an excellent means of testing some of his theories, of making fresh experiments, and of at least exciting public attention by the splendor of the process. In conjunction with M. Biot, he made the proposal to the government; Laplace and Berthollet supported it; and M. Chaptal, then Minister of the Interior, gave them the balloon which had been rejected by the government. This he had it refitted at the public expense. Furnished with chromatographs, thermometers, barometers, hygrometers, electrometers, compasses, and papers and pencils, Messrs. Gay-Lussac and Biot ascended from the garden of the Conservatoire, near the Rue de l’Observatoire, and the immense elevation attained was 3977 feet (4435 yards) above the Seine. M. Biot was affected with giddiness; but Gay-Lussac, by his experiments, ascertained that the influence of terrestri- nal magnetism on the compass was nearly as great as on earth; that during works of gold and silver, as with M. Aрагo 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 labors, and an Enjoyment of ninety years, M. Gay-Lussac died May 9, 1850, at Paris, in the mansion provided for him in the Jardin du Roi.

GAYAL. [Oz.] GEDRITE. [Mineralog.] GEL. [Bacteria.]}

"I was,” said by a Swedish critic to be equally eminent as a poet, a thinker, and an historian, was born at the iron-foundry of Ränster, in Ränster chapeley, province of Wermeland, Sweden, on the 12th of January, 1783. His father, the proprietor of the foundry, was a follower of the Reformation, and had emigrated from Sweden to Austria in the time of Gustavus Adolphus, and by establishing foundries had peopled the district. Geijer, in his ‘Minnen,’ or ‘Reminiscences,’ has given a vivid description of the wild country of the carriage, and the beauty of his native land as they rolled in it, to both of which he was strongly attached. At twelve years old he was sent to the school at Carlstad, five Swedish miles south of his birth-place, and at sixteen to the University at Upsal; during his residence at which he never enjoyed nothing so much as his frequent visits home, where he used to declare his conviction that the solemn academical disputations of Upsal would be the laughing-stock of future ages. At the age of twenty he was still without a degree, and when he took leave of his masters, this was the answer they gave him. He filled himself with power, and, after some studies, applied to a family of consideration to secure him the place of tutor, they received him for that inquirers who had been made at the university as to his character, and that he should not have been "found." His version of the same name, he was "imperfect copy of Dalin’s ‘History of Sweden,’ at the Round, for, latterly, they are the few who seem to possess himself of some paper, which was scarce in those quarters, and as fast as he wrote his essay, concealed the sheets in the unsuspected hiding-place of an old clock-case. It needed some contrivance to get the essay sent by post without taking any one into his confidence, but this too was done. Some months after his sister asked him what made it turn so red on a sudden as he was reading the newspaper. He had come on an advertisement requesting the author of ‘Memoire sur la Cynogone’ to send his last work to the printer, and he had written to him, which he had selected—to make himself known to the Academy. He had won the prize, and from that day was looked on in a different light by his family and all his friends. In the next year, when he visited Stockholm, he was one of the leading literary men, and universally regarded as a youth of high promise. In the same year (1804), on a visit to his native Wermeland, he became acquainted, on a hunting excursion, with another young Wermelander, a student of the University of Upsal, and they took a ramble together, sleeping occasionally in barns, and keeping up a continual disputition. This student, who became a friend for life, was Esaia Tegnér, afterwards Bishop of Wexio, now universally regarded as the greatest poet whom Sweden has produced. ‘We never talked together, then or afterwards,’ Geijer said in later life in his eulogy on Tegnér, ‘without disputing; and as we never came to agree, perhaps the solution may be, that we never understood one another. How this may be, I cannot tell; I know not, but I at least believed that I understood him.’

In 1806 Geijer took his degree, and soon after obtained a post in the National Archives; but he was anxious to travel in foreign countries, and in 1809 obtained his wish by visiting England, and afterwards, as ERRICK, tending tutor to a youth of the name of Von Schinkel. He stayed about a twelvemonth in this country, two months of which were spent in studying English at Stoke Newington. Several of Geijer’s letters from England were printed by himself in his ‘Minnen,’ in 1814; and was a frequent contributor to the Athenaeum, and to some of his writings now publishing. In one of them, dated from Bath in 1810, and first printed in 1855, he says, ‘I came to England with strange prejudices against the people. It is a nation, I thought to myself, in which a love for gain and a narrow selfishness has quenched all that is beautiful and
noble. Mine was a Swedish notion of selflessness, drawn from an imperfect state of society, where the connection between Sweden and its colonies was pretty obvious. Here every man knows that connection; and there is no honester man in the world than the selfish industrious Englishman, from the merchant to the day-labourer. This result may be owing to prudence as well as to principle, but neither he nor his brother, who shared his home, admired the honour and the mutual confidence that prevail in commerce and in life." On his return to Sweden, Geijer was soon engaged in the editorship of a magazine having the name of 'The Viking,' and became editor of 'The Iduna,' a popular ballad magazine containing numbers of poems by Geijer himself. The 'Iduna' contained in its earliest numbers poems by Geijer—"The Viking," "The Last Champion," &c.—which were full of vigour and spirit, which became immediately popular, were translated into Danish and German, and still retain their place in all selections of Swedish poetry. In subsequent numbers the early cantos of Tegnérs's 'Friholth' appeared for the first time. As in the case of many other Swedish periodicals during the period of the 'Iduna,' however successful, for an indefinite space of time: it was brought to an end after ten numbers, and the society of the Goths, which was painfully kept up by the exertions of Adlerbeth for many years after the other members of the society had dispersed, was dissolved when he died in 1844. Geijer put forth, in 1813, a translation of 'Macbeth;' and between 1814 and 1816 was associated with Atelius 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 of some importance. He was appointed adjunct or assistant to Fant, the 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 Fant, 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 more mature years brought him to deliver. 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 elogy of Sten Sture had prepared the way for the recognition of these works by the public. He was charged with wanting, and as a professor he was not remarkable for regularity in the discharge of his duties. His 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 triall to which he was subjected on account of his theological opinions. In an edition which he published about 1820, of the works of Thordal, a Swedish philosophical speculator, some passages in the introduction by Geijer, which was entitled 'A Philosophical or Unphilosophical Confession of Faith,' were regarded by some of his colleagues as hostile to the doctrine of the Trinity, and the author was denounced to the university authorities; but a long examination terminated in an acquittal, which was celebrated as an important triumph of liberty of thought and liberty of the press in Sweden. Geijer's connection in the society of the Church-Christian, 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, the same year, 'I am engaged in a trial to which he had been subjected did not prevent his being twice offered a bishopric, 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 both occasions. "Perhaps if I accepted," he wrote to a friend, "they might have a blameless middling bishop, but there would be an end to Erik Gustaf Geijer. It is not pride that makes me regard with horror of this dignity, this new path, these new duties. Better been working in the circle where I am at home, and know that I work to some purpose. For the University of Upsal I am somebody. That would lose more than Wermeland gained. Geijer was in 1819 elected a member of the Royal Swedish Literature Society as the head of Swedish historical literature. He planned a great history of the country, to supersede that of Dalin and Lagerbring, who have been for Sweden what Hume and Gibbon are for Great Britain; and he was universally acknowledged that his introduction to the great work was a volume of 'Svea Rikes Häfder,' or 'Records of Sweden,' promised a master-piece. Unfortunately, the great work was never carried further. Before proceeding with it the author was invited to present an address before the new Poor Laws and their bearing on Society, 'Svenska Folkskets Historia,' for the general collection of 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 Gustavus 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 founded on these, 'Kongens: Vingodsräkning,' 'The Carnation of Kings,' 'Jennförsökel af E. G. Geijer' (3 vols., 8vo, Upsal, 1843), disappointed the public expectation, but more owing to the insignificance of the royal legacy than to any deficiency on the part of the editor. Geijer was occupied 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 (1830) he saw cause to modify his views, and lost the approbation of several of his opponents. He was 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 pauperism were developed in a series of pamphlets and in 'Peter Laws and their bearing on Society, a Series of Political and Historical Essays,' which were published in English (Stockholm, 1840) as well as Swedish, and of which the English version, as it bears no 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 'Frihetstid,' or 'Freedom-Time,' as it is called, which extended from the death of Charles XII. to the revolution in favour of regal power which was forcibly effected by Gustavus III., is the last of Geijer's works of much importance. The 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 journals of Sweden, and his name was distinguished. He was the intimate friend of Tegnér and Atterbom, 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 Schlungenbad of Nassau, and resigned his professorship. He died at Stockholm on the 23rd 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 is still incomplete, though advanced (in 1856) 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 mentioned. The most important is undoubtedly his 'Svenska Folkskets 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 Uckert's collection. Geijer was in fact a poet of the age, and occupied with shorter pieces, articles in periodicals and papers read before the Swedish Academy, of which he became 'One of the Eighteen' in 1824, and was afterwards president. Many of the letters in his works are posthumously written, in which he was the author as yet not reprinted, but several of them—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 the collection, and embrace much that is worthy of notice and
preservation, especially when taken in conjunction with his method of "uninfluenced," perhaps the most attractive of production, but one which like so many others was left un-
finished. It should be observed that Geiger 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 one edition and in blank.

GEIGE. [CHEMISTRY. S. 2.]

GELATIN. [Tissues, Organic, S. 1.]

GENERATIONS, ALTERATION OF. During the course of development of many of the lower animals fluid passes into the sex ducts, which 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 are thus produced have been called 'eggs,' and the whole series of phenomena associated with this mode of reproduction have been called by its first expounder, Professor Steenstrup, an "alteration of generations." This phenomenon has been particularly observed in the Asciidae, Entozoa, Polyzoa, Salpoa, and Forctidinae. In the various articles on these families of animals, their mode of development 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 genera-
tions, from a translation of his work published by the Royal Society:—

"The mode of development by means of 'nurses,' or intermediate generations, is thus seen to be no longer an accidental phenomenon in nature. The circumstance of an animal giving birth to a progeny of individuals which, either itself or in its offspring returns to the form of the parent animal, is a phenomenon not confined to a single class or order of animals; it is a characteristic of nature, and one by which it has not been observed. It would consequently 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 whole system of nature, and be studied as a science. It will no longer be considered as something paradoxical or anom-
alous (as we have hitherto been too much inclined to esteem 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 development must also be elsewhere expressed, although it may be displayed in a form under which we shall less readily perceive and recognize it. This is seen when we trace the modifications, the intermediate steps, and the whole process of the development of the species, and whilst contemplating it through the phenomena in which it is manifested, we comprehend it in its true light.

"We collect and record in one view the whole system of development by means of 'nursing' generations, as is exhibited in the Bell-Sized Polypes (Comes), the Claviform Polypes (Coryne), Medusa, Salpoa, Vorticellae, and Entozoa, it appears as a peculiar and consequently as an characteristic feature of 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 several preceding generations are requisite. Thus the distinction between this course of development and that which is generally recognized 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 representation of the various phases of the species, and of a specific individuality, if I may so express it. If now we agree to regard such an incompleteness in the individual as the essence of this development, we shall comprehend its significance in nature, as we have thoroughly considered this course of development and the various phases of instances, is ad-
duced in the foregoing pages, and the many gaps in the series of observations. Thus we see the greatest incomple-

teness and the highest degree of mutual dependence in the Comes, and similar Polypes, in which the generations representing the unity of the species are very unlike each

other, and in which all the individuals are fixed, as it were, into an outward unity, or into a set of Polypes. They exist, organically connected with each other, and are normally free only in their first generation, and indeed only in their earliest stage of development, and only for a short time, since the free-swimming ciliated embryo swims about in the water at most only a short distance and dies. In order to realize the foundation of a new polype stem. In the Comes, or clavi-
form Polypes, the organic connection between the individuals and generations is rather more lax; the perfect gemmiparae or ovigerous individuals are usually more free, often even being solitary. In the Medusa, the whole structure of the Medusa is still fixed but more active and mobile in its parts; the individuals of the perfect generation leave the 'nursing' animal while still very small, and undergo remark-
able changes after they have become free and are swimming freely about; both generations of the Salpoa, finally, are free, and free swimmers, only the individuals of one of them are organically connected with each other; they have however no common organs (in the full-grown state), and if my expla-
nation of the alternate generation of the compound Aecidises is correct, it is likely that in the Salpoa there is a still further separation of the Salpoa at a somewhat lower stage; the individuals of the one generation are organically connected, without having a common organ; but both generations are fixed."

"In the Cestodes the generation of perfect individuals constitutes externally a unity; they are only successively 

regulated and governed by different periods. They advance in a certain manner, their whole existence is through-

connected with the 'nursing' animal. In some of the Tremato-
sodes, the later generations remain within the earlier until they have attained their full development; in others they separate themselves from the 'nursing' animal; they change, and undergo a complete metamorphosis; in some of these latter, the earlier generations are transformed into motionless, and, as it were, lifeless cysts, whilst in others they remain free and active (the Proteo, and the 'parent nurse' of C. oesophagum and C. ehrenstii) but retain during their whole life a form which, at most, resembles the larve of the more perfect generation. In this way an advance in a certain direction may indisputably be observed."

At the same time, at the outset of the present treatise we have already mentioned that no distinction is to be made as regards the interior, but also with respect to the exterior: 

form a stationary colony; after which the generations are detached more and more from each other, and become at the same time more free; and, finally, all the individuals constituting each generation acquire the power of free locomotion. In this latter stage, or that of freedom and perfection, we found the development of animals which are certainly no longer attached to immo-

bile objects at the bottom of the sea, but live burrowing in other animal organisms, and belong not to the sea but to fresh water. In a still higher and more free stage than this we observe the development of animals which do not belong to the water, but to the air, in that which occurs in the Apus. In the progress of its development through a series of generations has been already long known. In the spring, for instance, a generation is produced from the, which grows and is metamorphosed, and without previous 

fertilisation gives birth to a new generation, and this again to a third, and so on. Thus the seeds of many and certain species even as many as nine such preliminary genera-
tions will have been observed; but at last there always occurs a generation consisting of males and females, the former of which, after their metamorphosis, are wholly 

different from the latter, and the daughter generation takes place, and the long series of generations recommences in the next year, and in the same order. All the individuals are free, and enjoy the power of free locomotion, and undergo a complete metamorphosis. Here, however, we have other animals which, after metamorphosis, inhabit other organisms; at most they are only externally parasitic, and on plants alone; the phenomena of this mode of develop-
ment are no longer exhibited by Entozoa, but by Entozoa, and the course of development is in itself: but in the external, more free, and nother form in which it is
Now exhibited, the endeavours to attain something higher is manifest. Each line or gesture of the worker brings its offering nearer to the perfect form aimed at; but the achievement of perfection is effected 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 themselves being largely or completely spent. Any delay, any lack of precision, 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 cause of action, on its own initiative; and 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 form in which the care of the young is provided for, by the voluntary action of numerous individuals for the benefit of 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-parents, nor is their nourishment secreted 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 and its eggs till the spring, is a provision 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 assistance of the parent, to the care of the kind of cells in which the young are provided, to tend the development of the females, in order to which 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 young. The male insects, however, they contain a better sort of food, are erected for a later and less numerous progeny of eggs; and again in others, which are more roomy and provided with the best kind of food, but of which there is only a few, is the last brood of the female developed, in which the provision is in the proper individual, 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 return, 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 in the winter; the fertile females alone remain alive, and propagate 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 species. The Termites, the same thing occurs; the many thousand individuals which constitute one of these colonies are principally ‘feeders,’ or individuals which have originated in the preceding 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 young; so that, out of all the various preceding divisions, individuals apparently arise which assist in the development of the more perfect progeny in the winter. There are in 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 wax to the place to which the whole according to the Termites, the same thing occurs; the many thousand individuals which constitute one of these colonies are principally ‘feeders,’ or individuals which have originated in the preceding 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 young; so that, out of all the various preceding divisions, individuals apparently arise which assist in the development of the more perfect progeny in the winter. There are in 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 wax to the place to which the whole according to the
slaughter, for which feast of arms the emperor gave him the command of the 11th corps. General Gérard was several times severely wounded, and he regarded the sole of his left foot as his "badge of honor." He died at Paris on October 18, 1813. During the defence of the French territory in 1814, his zeal and intrepidity were frequently commended by Napoleon, especially at the victory of Monte- beau. After his return from Elba, in 1815, the Emperor gave him the command of the French forces in the west. On the 18th of June he was under the orders of Marshal Grouchy at Wavres, and when the report of the cannon was heard proceeding from the forest of the Soignes, Gérard recommended an immediate advance of Grouchy's army of reserve upon Antwerp.

On the return of Louis XVIII., Gérard retired to Belgium, where in 1816 he married the daughter of General Valence. The following year he was permitted to return to Paris, where he was appointed brigadier-general. In 1821 he was appointed minister of war, and 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, and a fleet of 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 23rd of October, 1834.

The provisional government of February 24, 1848, raised Marshal Gérard to the function of grand chamberlain of the Legion of Honour. The marshal lived to see the restoration of the Bonaparte dynasty. He died at Paris on February 17, 1852, and was interred in the chapel of the Invalides.

GERARD, JEAN-IGNACE-ISIDORE, but best known by his pseudonym, GRANDVILLE, one of the most eminent French caricaturists and designers of illustrations. He was born at Nancy, and went to Paris young, an adventurer without money, and without friends; after a while got admission to the stables of Lecomte; managed to subsist by designing costumes, &c.; and continued improving his artistic powers and increasing his stores of observation till 1829, when he brought out his "Metamorphoses du Jour," by Grandville, a series of grotesque, piquant, and mirthful crayon commentaries and criticisms on passing follies. These sketches had a prodigious success; Grandville's position was secured; and his pencil found abundant employment. The revolution of 1830 terminated his time for a time with his occupation; but when familiarity had brought its inseparable attendant, and the criticism that comes for the critic, that was a mark for the shafts of ridicule, Grandville made himself abundantly merry with the face and person of his sovereign and his royal advisers. Grandville was the very soul of "La Caricature," and his satire was equal to that which was before produced by the master himself on the fables of La Fontaine, &c.; but on the promulgation of the law re-establishing the "cenare préalable" for designs, he abandoned politics, and threw all his energy into the making of drawings on wood for illustrated editions of classic authors, &c. Here he found a new field of triumph. His drawings were in their way almost the perfection of designs for engraving on wood. Not merely were they admirably conceived, and excellent as exemplifications of the passages they were intended to illustrate, but clear, correct, and vigorous in drawing and brilliant in effect, they exhibited remarkable aptitude for that particular kind of engraving. As illustrations—full of fancy, ingenuity, quaint and genuine humor, and singularity suggestive—they not only pleased the eye, but really added new charm to the text. Among the works he illustrated were "Gulliver's Travels," "Robinson Crusoe," "La Fontaine's Fables," "Beranger," "Jerome Patolet," &c. Indefatigable in labour, he produced an almost infinite number of designs, and yet his active fancy showed no symptoms of exhaustion. He developed a method of distinguishing himself from other illustrators of books, by giving to each child within a brief space of time by some of the ordinary ills of childhood, when his third child in attempting to swallow a piece of meat got it so firmly fixed in its throat that all attempts to remove it proved unavailing. An inhalation was proposed as the only remaining chance, dangerous remedy; and while Grandville hesitated whether to
The surface of 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, we plant the Jokull’s, Icy Mountains of the region, which stretch out in a north-easterly 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 rivers and canals which diverge from the mountainous mighty mass 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. Local workers in a Supervolcanic zone. On these pools, where a repulsive blue-black aluminous paste is boiled, rising at times into huge billows, which on bursting scatter their slimy spray to a height of 15 or 20 feet. From the base of the water’s edge, a range of craters and fumaroles is visible. These are placed in the immense snow-fields which crown the summits. From the arches and fissures of the glaciers vast masses of water issue, falling in spouts in cascades over walls of ice, and spreading for miles and miles over the country before they find definite outlet. Extensive morasses are thus formed, which lend their comfortless monotony to the dismally 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 air’s open breast; others find their passage through the conic glasses which traverse these underground 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 Jokull 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 immediate cause, the aliment of the spring, is from the rains which fall like rain upon the surface of the ground, upon the soil, and 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 hot, 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 chaona 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 Gottingen. A summary of these views, with experimental illustrations, 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 Geyser.

"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 direction 60 feet. The interior of the tube and basin is covered with beautiful white plaster and is designed to resist the blows of a hammer. The first question that presents itself is, how was this wonderful tube constructed? How was this perfect plaster laid on? A glance at the constitution of the geysier 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>Percentage</th>
</tr>
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<tr>
<td>Silica</td>
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"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 this outer deposit was burnt off, and the water boiled to a paste, 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 manner was perfectly free from sediment. Further, an attempt to ascertain the origin of 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 Geysier, the property of Sir Henry Holland himself, exhibits the features 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 detect where the water has formed the system of the mound the spring must also have formed the tube which perforates the mound; and thus we learn that the Geysier is the architect of its own tube. If we place a quantity of the geyser water at an interesting height, it will take place—in the centre the fluid deposits nothing, but at 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 held on, and not until the water has been evaporated 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 itself. Imagine a simple thermal spring whose waters trickle over its side and down 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, 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 colossal column of water is produced, and the Geysier a stately cataract which has so long puzzled and astonished both the traveller and the philosopher.

"Before an eruption the water fills both the tube and basin, dotating filled; and when this stimation a violent ebullition in the basin is observed; the column of water in the pipe appears to be lifted up, 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 subterranean 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 entire enigma. A little below the place 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 30 feet of this point was 195°. Of course, its boiling point here is 134°. We have just alluded to the detonations and the lifting of the geyser column by the entrance of steam from beneath. These detonations and the temperature of the water, in the course of these intervals, have been heard and observed at various intervals before an eruption. During these intervals the temperature of the water is gradually rising. Let us see what must take place when its temperature is near the boiling point. Imagine the section of water at 30 feet above the bottom to be raised six feet by the generation of a mass of vapour below. The liquid spreads out in the
basin, overflows its rim, and thus the elevated section has six feet of water pressure upon it; its boiling point under this diminished pressure is 121°; hence in its new position its actual temperature (129°) 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. Steam is developed underneath; 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 has ascended, and thus the basin is replenished.

The detonations are heard at intervals, and ebulitions are observed; but not until the temperature of the water in the tube has once more nearly attained its boiling point is 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 sufficient cause of the eruptions. Its sufficiency was experimentally shown during the eruption of a geyser of galvanised iron six feet long was surmounted by a spring in a small underground chamber 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 void back into the tube, became heated, and was discharged as before."  

Sir George MacKenzie, it was 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 was endeavoured to obtain 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 whole of the subterranean cavern disappears with the necessity which gave it birth.

"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 lessening of the pressure described above.

"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 is so compressed that the pressure at the boiling point, the eruptions of necessity cease. The spring however continues to deposit its silica and forms a 'fang,' or cistern. Some of these in Iceland are of a depth of 30 or 40 feet. This is indescribable; over the surface a light vapour curis. In the depths the water is of the purest, azur, and tints with its own has the fantastic incarnations on the cistern walls; while at the bottom is observed the mouth 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 shafts 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 simple thermal spring; in its manhood as a fully developed persistent eruption; in its old age as the tranquil lung; while its death is recorded 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 eruptive spring of Iceland. The depth of its tube in 44 feet. 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 about a foot. Water is continually fed into the tube and thus stopping it, eruptions can be forced which in proportion of height often exceed those of the Great Geyser. Its action was illustrated experimentally in the lecture, by stopping the great tube before alluded to loosely with a cork. After some time the water, by the increase of heat converting itself suddenly into steam, the water was ejected to a considerable height—thus demonstrating that in this case the tube alone is the sufficient cause of the phenomenon." ('Proceedings of Royal Institution.')

The results of the researches of Professor Bunsen on the Geysers of Iceland seem to throw great and unexpected light on the phenomena of volcanoes. Sir Charles Lyell notices his account of Bunsen's researches with the following remark: "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, and that a fluidified lava is contained in the cavity. Water and the usual mixture of air penetrates 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 an eruptive column may consist of a continuous mixture of water, 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 molten lava; and the hot water, being higher in temperature, would fall in layers of ashes on the surrounding country, and at length, by the arrival of lava and water more and more heated at the orifice of the duct, or the crater of the volcano, expansive power may be acquired sufficient to expel a massive current of water and lower heated lava, by a series of regular eruptions of quasi-liquids, during which fresh accessions of heat are communicated from below, and additional masses of rock fused by degrees, while at the same time atmospheric or subterranean water is descending from the surface. At length the conical mass is elevated to such an extent that a new cycle of similar changes is renewed." (Principles of Geology, p. 558.)

GIANTHOLITHS. [MINERALOGY, &c.] By the Rev. Mr. M'Mahon, M.R.C.S.  

GILT-HEAD. [CHIRURGY; CARNIVORA.]  

GILOBERTI, VINCENTO, 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, Giberti was appointed chaplain to the court. In 1832 he performed the 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. For some time he was kept in prison. There he was detained for about two weeks, but was at length set at liberty on the condition that he quitted 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 schools of that city.  

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 produced 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 Sovranatural," one Dicono sulle Convenienze della Religione Rivelata alla Mente Umana e col Progresso Civile delle Nazioni," 1837. His "Introduzione alla storia del cristianesimo" in "Il glossario Italiano," 1840, was followed by the "Lettere intorno agli Errore Filosofici di Antonio Romagni," 3 vols., 1841-43, and the two treatises "Del bello," 1840, and "Del bello," 1843. His "Primo Morale e Civile degli Italiani," 1843, was read with eagerness by all the Italian public, and excited expectations of the regeneration of that unfortunate country, which, with the sole exception of the Sardinian kingdom, had not hitherto been realized. There was to be a confederation of the Italian states, in which the Roman Church was to be the head, and the Pope, as monarchs and Jesuits, were all to bear a part. The states were to be reformed, and public rights and privileges gradually established. The pope was to be the head of the Roman Church, and not of the state; the King of Sardinia was to be the military chief of Turin and the grand citadel. The Jesuits alone were dissatisfied, and Gioberti
attached them in his 'Prolegomeni,' 8vo, 1848. Plus IX
on his accession to the post of a prior in 1846, adopted the views
of Gioberti, and began to carry out the reforms recommended in
'Il Primauro; 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 Gesuita Moderno,' 5 vols.
8vo, 1848.

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,
where his arrival was welcomed with universal enthusiasm by
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 received with the greatest enthusiasm,
so that his return 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
idea 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
cabinet. He soon found himself to be in a false position;
and his diagnosis of the present and future of his colleagues led to a dissolution of the ministry on the 15th of
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 conflict with Austria. His mission
was unsuccessful. 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 returned in Paris, and the fruit of his renewed labours was published in the 'Civiltà d'Italia,' 2 vols. 8vo, 1861. He died October 26, 1862,
in Paris.

GIRARDIN, MADAME DELPHINE DE, the wife of
Émile Girardin, and daughter of Sophie and Antoine de Mad
difique, was born on the 27th of August, 1805, at Aix-la-Chapelle.
She was what is called a precocious genius, and at the age of
fourteen was noted for her remarkable beauty. In 1823 a
poetical elegy of hers, containing all the illustrious names of the
day, was honourably mentioned by the French Academy.
On the 26th of April, 1837, she was received with great pomp
in the Capitol of Rome by the Académie de Titre, as one of
their members. She received a more flattering ovation in
Paris, on her return. The artist Lagre, who had recently
married her, prepared a large history painting, of which
Madèle. Delphine Gay to a place of honour beneath the dome,
where she recited some of her own poems in the presence of
a brilliant assembly. As soon as she finished a shower of
flowers and roses was thrown upon the stage. King Louis
X. ended her elopement of 1500 francs from her private
purse. Shortly after, she met with M. Émile de Girardin, to
whom she was married in 1831.

Immediately after this union Madame Girardin engaged in
a variety of literary undertakings, producing novels,
romances, and fugitive poems for the book-sellers; tragedies,
comedies, and vaudevilles for the theatres; and feuilletons
for the newspapers. Her charming 'Lettres Parisiennes' appeared in
the journal 'La Presse,' under the name of Vincente C. de Lancy. She occupied with her husband at Chailot was the resort of all the célèbres
in art and literature, as well as of the élite of the Beau Monde.
Every intelligent foreigner desirous of seeing the eminent and
distingushed personages, which swarmed at her house, hastened
to this house, built on the model of the Great
temples.

This clever authoress died on the 29th of June, 1855,
and on the 5th of July she was followed to the grave by an
innumerable crowd. The chief funeral oration was delivered by
Jules Janin.

The catalogue of her works is very long; but the following
are her most esteemed productions:—'Le Pélican,' published in
1833; 'Le Lorgeron,' a romance, 1839; 'Que se sont
Céleste et Clémente,' a romance, 1834; 'Le Canne de M. de Balaize,' 1836; 'L'Ecole des
Journalistes,' a five-act comedy, 1840; 'Judith,' a tragedy,
1843; 'Cléopatre,' a tragedy, 1847; 'Lady Tartufie,' a
three-act comedy; 'Produced much success,' 1845; and 'La June
Fait Pouer,' 1844.

GLADIOLUS, Cuss-Flag (from 'gladius,' a sword, refer-
ring to the shape of the leaves), a genus of plants belonging to
the natural order Fruebeae. It has a tubular 2-lipped corolla;
seeds with a testa; and seeds with an arilus; root a coated bulb; leaves ensiform,
arrow. The species in the gardens are bulbous, and are
chiefly brought from the Cape of Good Hope.

G. florivorus, 2 or 3 flowers, 2-3 furrows. The upper
division of the corolla is denerate, the lower segment near
ly equal and lanceolate; anthers longer than the filaments;
capsules with 3 furrows. It has been supposed to be an
aphrodias, a reputation obtained from its acrid qualities,
which were supposed to make it poisonous. A certain
Hotentot eats the tubers or corms of several species of this genus, the starchy
containing them nutritious.

G. triphyllum has about 3 flowers in one row; the anthers
much shorter than the filaments. It is found in the moun-
tains of Carrara.

G. palustris has 3 or 4 flowers, 2-3 furrows; the tube twice
as long as the seed-veil; the claw of the middle division
curved and renate; the lobes of the stigma papillosus-ciliate
almost from the base; anthers shorter than the filaments;
seeds at the base obtuse, parallel; capsules oblong,
obovate, rounded at the top, marked with six equal furrows.
It is found in Germany.

G. semiovatus has second flowers; the filaments half as
long again as the anthers; anthers at the base obtuse and
parallel; the tube half as long as the anther; the stigma gently broader upwards, papillosus-ciliate
almost from the base; capsules 3-edged, obovate, impressed
at the top, toothed, or winged. It is found near Stettin and Frankfurt-am-Oder.

G. Illyricus has second flowers; the tube three times as
long as the anther; the division of the stigma linear from the
base to the middle, and with a smooth margin suddenly enlarged
at the top with a papillosus ciliate margin; the capsules
obovate, 3-edged. A native of Illyria.

G. imbricatus has second approximate flowers; the tube
nearly three times as long as the anther; the division of
the stigma gradually broader upwards, papillosus-ciliate
almost from the base; the capsules have 5 or 6 rows with 3 rounded angles. Found
in Bohemia and Slavonia.

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 internal ones, the
lower unequal; anthers about as long as the filaments;
seeds globose, prolonged downwards. It is a native of Sicily.

G. Byzantinus has numerous flowers in two rows; the upper
segment of the corolla covered by the lateral ones;
the lower divisions of the stamens the longest; the anthers
longer than the filaments; seeds winged; leaves long,
ensiform, 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 sepa-
rating the parts of substances which are separated from the
blood the peculiar substances of which they are composed.
The term gland however is only strictly applied to those
forms of tissues which separate peculiar matters. "A true
gland," says Dr. Carpenter, "may be said to consist of a
closely packed collection of follicles, all of which open into
a common channel, by which the product of the glandular
action is collected and delivered. The follicles contain the
secreting cells in their cavities, whilst their exterior is in
contact with a network of blood-vessels from which the
cells draw the materials of their growth and development."

In a wide sense the term gland has been applied to those
parts of the body which excrete or absorb the food or carrying to the blood the materials of used-up
substances. [Amaurosis.] In all cases the cell is an active
agent whether of absorption or secretion. The agency of
the cell in the blood is about 10 by 19, in the way in which
the chyle is taken from the intestines and carried into the lacteals.

For further investigations on the structure of Glands, see
Tessier, Osmaju, S. 1, pp. 643, 644, 644. After describing the
development of glandular tissue, Professor Goodir
wrote, 'The emphasis on this subject is determined with the following
marks:—

"It appears to be highly probable therefore that a gland
is originally a mass of dissociated cells, the progeny of one or
more parents, and connected by no relation whatever with the
embryo gland may or may not, according to the case, send
a portion of the membranes in the form of a hollow cone

2 N 3
into the mass: but whether this happens or not, the extremities of the ducts are formed as closed vessels, such as are formed at the extreme or oral end of 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 vessels. This would appear to be the normal form of a follicle, and the source of the germinal 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 cell-cavity with 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 1842, I have satisfied myself that I was in error in supposing that the cavity of the cell-wall was the cell-cavity. The nucleus is the part which effects this. The secretion contained in the cavity of the cell appears to be the product of the solution of successive developments of the nucleus, which in some instances contains in its component vessels the peculiar secretion, as in the bile-cells of certain Moluscos; and in others develops into the secretion itself, as in seminal cells. In every instance the nucleus of each cell surrounds the secretion contained in the cell-wall, and in the cavity of 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 seeing a secretion cast in a cell by experiment, at the time fully anticipated—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 secretion of the third order is, that when thrown into the cavity of the gland they consist of entire 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 thrown out of the gland cavity, and the cavity, and therefore 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 before 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 decapod crustacea undergoes successive developments, the solution of the secreting cells, and the duct---but only becomes developed into spermatogonia 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 apparently separately from which the gland cells are developed 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. It is one of other instances in which cell 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, that all the true secretions are formed or secreted by a vital action of the nucleated cell, and that they are thrown out of 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 the simple inversion of a secreting membrane called 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. In these cases the follicle is in the 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, we have a modification of the lower, by which we have the same simple development. Thus the liver is some of the Polypes and lower Moluscos consists merely of a series of separate follicles placed in the walls of the stomach. The chick was first in the egg presents the same condition of this organ.

The Gland and Glandular in the commencement of the development of a mammatory gland in the Mammalia. In the Ornithorhynchus this organ consists of a mere cluster of blind sacs. In the same way in many fishes the pancreas begins its existence as a mere group of blind follicles. The next stage in the complexity of a gland is where a number of follicles open into a single tube. Such a condition of the gland is seen in what are called the Melobian glands of the eye. The larger glands of the body, as the pancreas, liver, and salivary glands, are merely variations 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 opening.

GLOMEROUS TUBULES. [LINCOLNSHIRE.]

GLAUCINE [CHEMISTRY, S. 2.]

GLAUCOIDE [MILLER, B. M.]

GLANCOLIC [MILLER, B. M.]

GLECHOMA [MAFFTA, S. I.]

GLEICHNIA [CHEMISTRY, S. 1.]

GLOBE-FISH [TETRADON]

GLOBE-FISH [TETRADON]

GLOBE-PLUMER [TROLLIUS]

GLOBULAR [TROLLIUS, S. I.]

GLOCOCLADEIA, a sub-order of Sea-Weeds belonging to the natural order Cryptocificaceae. The fronds are loosely gelatinous, the filaments of which are composed lying apart from one another, surrounded by a copious gelatine. The faldellas are immersed among the filaments of the periphery. It embraces the following genera:

Corallina.—Fong crustacea, skin-like.

Nemalia.—Fong frilliam, solid, cellular; the ramuli only covered with the frilliam.

Glosochloris.—Fong tubular, hollow, the walls of the tube composed of radiating filaments.

Nemalia.—Fong frilliam, solid, elastic, filamentosus; the axis composed of closely packed filaments, the periphery of monozone, the monofilar, and monostriatum.

Dendroclades.—Fong frilliam, solid, gelatinous, filamentous, the axis composed of a net-work of annostomising filaments; the periphery of moniform free filaments.

Glosochloris.—Frilliam frilliam, consisting of a pointed filament, whorled at the points, with minute mucilegous gelatinous ramuli.

(Harvey, British Sea-Weeds.)

GLOSSOPHARYNGEAL DENTAL UNION, a manufactory 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 north-western boundary of the county, in 54° 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 Manchester and Sheffield and Manchester and Huddersfield railways. The population of the township of Glossop in 1851 was 5467; 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 the district, was 36,685. The living is a vicarage in the archdeaconry of Derby and deanery of Lichfield. Glossop Poor-law Union contains 10 townships and hamlets, forming a part of Glossop parish, with an area of 30,807 acres and a population in 1851 of 19,860. The Poor-law Union, besides the parish, includes Glossop, High Glossop, and Ashopton, and the townships of Hopwood, Hollinswood, and Hollinwood, with the manorial and other lands of the inhabitants. About 60 cotton-mills are in the town and neighbourhood; there are also silk-worms, paper-mills, iron-foundries, dye-works, and bleach-fields. Besides the parish church, there are chapels for Independents and other Dissenters. A charity for
closely 34 poor men and women was founded by Joseph Hague, Esq. There is a savings bank. Melandra Castle, situated near the Armadillos, is the site of the 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 Brough.

GLOSSOPORIS, a genus of Animals belonging to the order Amelida, and placed commonly near the Leeches. It has a posterior disc, but it is not ascorial. GLOSSOPODIUM, [Chemistry, S. 1;] TIMBER, ORGANIC, S. 1.] GLYCERIN, a genus of Desirobrecta Amelida. It is distinguished by the form of its head, which terminates in a conical, fleshy horn-like point, which is divided at the top into two, with a denticle on each side. GLYCERYL. [Chemistry, S. 2.] GLYCOCINE. [Chemistry, S. 2.] GLYPSODON, a genus of Acanthopterygian Fishes belonging to the family Scincidae. The gill-covers are entire, and they have a single row of tranchant and sometimes toothed 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 the teeth) belongs to the order Edentata, and allied in form and structure to the modern Armadillos. The first notice of the discovery of the remains of the skeleton of a large edentate animal, with fragments of a tesselated bony armor, similar to that of the Armadillos, was given by Cuvier, in 1822, in his description of the Glossopondon, in his chapter on the Megatherium, in the 4th edition of the 'Oeconomie Fossiles,' published in 1812. This notice occurs in an extract from a letter addressed by D. Danilois Larramde, curator of the Museum of History, to the Auguste St-Hilaire, which is published in the 'Mons. de l'Acad. des Sci. de Paris,' in 1832. A femur was discovered in the Rio del Lanco, branch of the Napoles 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 one of the large species of Glossopondon, and bore the peculiarities of the bony armor, of which the curé promises to send one of the component pieces to M. Auguste Geoffroy. The tail was very short and very stout; it had in like manner a bony armor, 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 cultivation 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 front of the Foemines, and in small tentacles.

These remains were supposed to belong to the Megatheriidae, and Cuvier does not appear to suspect that they belonged to anything else, as he merely remarks that the Megatheriidae had pushed its analogies with the Armadillos so far that they might be identified with these.

Subsequently remains of this kind were sent to England, and in the meantime M. Lavoisier and Mr. Pentland, on comparing these with those originally sent to England, came to the conclusion that they belonged to the genus Glyptodon. This however was doubted by Mr. Cliff and Professor Owen, seeing that the confirmation 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 conjecture," says Professor Owen, "that Sir Woodbine Parish 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 Mancas, about 20 miles south of the city of Buenos Ayres, and with the account of this remarkable discovery there was at 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 Parish states is exactly like that in my example of the same species; the structure proved 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. I do not propose to assert so new and important a discovery as that of a new genus of the Armadillo family, for which I proposed the name of Glyptodon, in reference to the plated or sculptured 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 Cacochomus by Cuvier. It differs from the section of the species of that animal, and appears to be the result of a long process descending from the sygno, in both which respects it resembles, and evidently indicates a transition to the Megatherium.

Numerous and of this curious and interesting animal have been found in various parts of the country, and a very fine specimen, with the coat 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, S. 4.

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 armor, no remains that could be regarded as the tesserae of such a covering has 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 armor of some gigantic quadruped and the skeleton of the Megatherium having been discovered on the same level. 2. The skeleton, or its parts which have been actually associated with the bony armor 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 tessera of the bony armor in question to the skeleton of the Glyptodon, are the same as those of the bony armor and skeleton of existing Armadillos, but are vastly smaller as compared with the bones of the Megatherium. 5. No bony armor composed of tesserae, 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 armor 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, 1783. This eminent chemist and contributor to the literature of the sciences of which he was an equally eminent academic teacher, began for four generations had 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 of his great devoted himself to this science. He 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 death removed him to Tübingen, where he practised chemical manipulation in the pharmaceutical laboratory of his near relation, Dr. Christian Gmelin (the son of Johann Conrad Gmelin and father of Christian Gottlob Gmelin, both already mentioned), and attended Kuhlmeier's lectures. In the autumn of 1800 he returned to Göttingen, where he devoted himself with zeal to all branches of medical science, but especially to chemistry, for which he attended Strömeyer's lectures; he also studied mathematics. After passing a distinguished examination, he went, in the summer of 1809,
known facts of the sciences are condensed into the smallest possible space, but nevertheless it presents a complete picture of the development of the sciences and the contributions of other chemists were often indebted to the author for first giving them their true value. In this great work, to use the words adopted, in 1804, by the President of the Chemical Society of London, of which Gmelin was a foreign member, "the labours, the advice and the discoveries of an infatuated but objectivistic, and on the authority of the several investigations, all that has been observed within the domain of chemistry, —not, indeed, withholding his own opinions, but placing himself side by side with those of others, and never suppressing the latter."

The '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 is a work of profound and vast extent, giving 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 sciences then known; the fourth, which had just been prepared by Gmelin himself, was published from 1843 to 1853, and comprehends inorganic chemistry, but, unfortunately, only a small part of organic chemistry. From this the English edition, now in course of preparation, of the Transactions of the Cavendish Society, is translated by Mr. Henry Watts, B.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.

In the 'Annals of Philosophy' for August and September 1821 there is an account of Gmelin's 'Handbook,' that he became quite neglectful of his health. In 1846, 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 elasticity of speech. He still worked at his 'Handbook' with untiring assiduity, and the work was published in 1850. In 1852, he was again attacked by paralysis, which obliged him to resign his professorial functions. He still however remained active in the cause of science, and laboured on the second edition of the 'Organic Chemistry,' which he completed in May, 1852. But from that time his powers, 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 undertaken. In 1800 he undertook, in conjunction with Tiedemann, a series of experiments on digestion; and in 1808 and 1809 these two philosophers published their celebrated work, entitled 'Die Verdauung nach Vorontsen,' and he devoted himself to the science, —"a service in which," in the words of competent authority, "he surpassed all his predecessors and all his contemporaries"—committed in the production of his 'Handbook of Chemistry,' the beginning and later progress of which have been described. After the death of his son, F.R.S., afterwards Regius Professor of Chemistry in the University of Glasgow, he published the earlier editions of his 'System of Chemistry,' in which he reduced to order, in a clear and comprehensible system, the facts of science, scattered at the time he wrote over a thousand different veins of knowledge, and had thus himself conferred an inestimable benefit, especially on British chemists; other writers also had arranged large quantities of materials in systematic order; but for completeness and facility of collation, and consecutiveness of arrangement, Gmelin's 'Handbook' is unrivalled. In it the
own productions, and it is said that in composing a dialogue, it was his practice to recite all the different speeches in character 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. His soon tried his powers in the drama, and his comedy of "The Tsar's Servant," which was surprisingly successful, but its success was due to a peculation and misconduct among all the government officials, that when he is at last discovered they are glad to let him off scot free and hush up the whole affair. The Emperor Nicholas I, who had not seen the play, was greatly pleased with its marked applause. It was however chiefly popular among the Russian liberal party, who 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 looked upon in 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 his famous novel, the "Dead Souls" ("Pokhodnymiia, Chigachova, Ila Mervtviia Dushi"), published at Moscow in 1842. The English public has an opportunity of forming an estimate of this, the principal work of Gogol's, in a passage in the "Periplus," in which Gogol had appeared to speak with personal conviction on this subject. He says that he had not the courage to say that he did not share the opinion of their admirers. "These persons," says Bielineski, "may in their admiration of you have made more notes with their applause than the case required; but after all, their enthusiasm sprang from so pure and noble a source that it was only sincere, and it behooves us not only to print new sketches of life, but not 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 Bielineski nor Gogol ever returned. Bielineski died in France of the plague after the appearance of this passage in the "Periplus." The book may be suspected of having its 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 a pension and retired to his native city of St. Petersburg. He was honored by a visit from the son of the time of the publication of "Select Passages from N. Gogol's Correspondence with his Friends" ("Vubranovnya Miestia is Perepiiska s Druznami"). St. Petersburg, 1847. St. Petersburg, 1847. From the height of popularity this publication sank 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, who beyond the frontier. Bielineski, who was one of the principal, attacked in so far as the "Sovereigns," one of the leading reviewed in St. Petersburg, in an article which could hardly have been expected to pass the censorship. Gogol addressed to him a letter of remonstrance, protesting that the change which had taken place in his opinions was the result of conviction, and the reflection of the "Sovereigns." In a letter to "Zriiiza," or "Polar Star," a Russian periodical issued in London in 1855. "Yes," says Bielineski, "I loved you with all the passion with which a man warmly attached to his country, can be found, and I love the great leaders in the path of self-consciousness, 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 ever seen a single majority, and only a few whom you and I alone love. You," he afterwards broke out, "you, the author 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 unmistakably above the clergy of the Roman Catholic Church, do not you think that the latter 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, and that every Russian, every Russian the representative of glutony, meanness, servility, impudence? I will not dilate on your dilthrambolies about the bond of affection between the Russian clergy and the people, which I have already refuted. What I have met with so much sympathy, and has lowered you even in the 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 Autocracy; only continue to have the good sense to contemplate it from a 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 convictions as this. What I have said may then be summed up in the name of "man of genius." Bielineski goes on to accuse him of views of personal enmity, and touches with bitterness on a passage in the "Periplus," in which Gogol had appeared to speak with personal conviction on this subject. He says that he had not the courage to say that he did not share the opinion of their admirers. "These persons," says Bielineski, "may in their admiration of you have made more notes with their applause than the case required; but after all, their enthusiasm sprang from so pure and noble a source that it was only sincere, and it behooves us not only to print new sketches of life, but not 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 Bielineski nor Gogol ever returned. Bielineski died in France of the plague after the appearance of this passage in the "Periplus." The book may be suspected of having its origin partly in political feelings.

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gives off sulphur when strongly heated, while gold melts without any such odour.

Native gold is to a large extent obtained from alluvial washings. It also is found disseminated through certain rocks, especially quartz and talcose rocks, and is often contained in pyrites, constituting the auriferous pyrites; the deposits of 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 spine of mountains which runs nearly parallel to the coast, especially near Villa Rica, and in the province of Minas Geraes; in New Granada, at Antioquia, Choco, and Guion; in Chili; sparingly in Peru and Mexico; and in the southern of the United States. In Europe it is most abundant in Spain and Portugal, in the province of Castille, in the Carpathian Mountains of Bohemia, in Transylvania, at Kapnik, Vorospatak, and Offanubay; it occurs also in the sands of the Rhine, the Reuse, 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 Edelfors. In the Ural Mountains there are valuable mines, also in the Caillies Mountains in Little Tibet. There are mines in Africa at Kordofan, Katanga, and Assam, in the Sahara, in the western part of Africa from Senegal to Cape Palmas; also along the coast opposite Madagascar, between 23° and 25° S. lat., supposed to have been the Ophir of the time of Solomon. Other regions in which gold is found are the interior of Abyssinia, Formosa, Ceylon, Java, Sumatra, and the Philippines.

Until lately nearly all the gold of commerce came from Asiatic Russia and Mexico, but recent discoveries of gold in California and Australia have opened new and vast sources of supply.

From 1860 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 precious metal. During the 14th century the supply of gold and silver was still mainly derived from the Americas, the great mines of Valencianas producing 125,000l. sterling per annum for 40 years, and the district of Zacatecas adding largely to the amount, although there were rapidly failing towards the end of the century. A great increase of gold was produced from the mines of Russia, which is still very productive; they are principally alluvial washings, and these washings seldom yield more than 65 grains of gold for 4000lbs of soil, never more than 130 grains. The alluvium is generally most productive where the loose material is most ferruginous. The mines of Ekaterinburg are in the parent rock—a quartz constituting veins in a half-decomposed granite of Beresit ish, which is connected with talcose and chloritic schists. The shafts are about 500 feet deep, and thence lateral galleries are run to the veins. These mines afforded between the years 1725 and 1841 679 lbs. of gold, or about 30,000 l. troy. The whole output of these mines yields in 1843, 970 lbs. of gold, or 42,000 l. troy, half of which was from Siberia, east of the Urals. In 1843 the yield was nearly 60,000 l. troy; in 1845, 62,000 l. troy; and in 1846, 75,325 l. troy.

In the five following years to 1851 nearly 296,832 lbs. troy 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 now about 200,000 l. troy. The sands of Danube contain gold in small quantities. 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 4500 l. troy, and Southern Africa 1250 l. troy. 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 9,000,000 sovereigns, being at the rate of 18,000,000 a year. The increase in the circulation of the coin, gold coins, that the rate of production can scarcely keep pace with the demand.

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. received light coin, and 36,000,000l. still circulated; in 1840, 100,000l. may be regarded as the quantity of gold coin in circulation, allowing from 3 to 4 per cent. for the natural wear of the coin.

In the year 1856 there were coined at the royal mint 4,806,160 sovereigns, and 2,391,909 half sovereigns; total 7,200,114½ l. 10s.

A large quantity of gold is consumed every year in arts and manufactures, and thus regularly removed from the stock of our circulating wealth. In Birmingham not less than 1000,000., of fine gold are used every week, and the weekly consumption of gold leaf is as follows:

<table>
<thead>
<tr>
<th>City</th>
<th>Amount</th>
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<tbody>
<tr>
<td>London</td>
<td>65</td>
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<tr>
<td>Edinburgh</td>
<td>35</td>
</tr>
<tr>
<td>Birmingham</td>
<td>70</td>
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<td>Dublin</td>
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<tr>
<td>Liverpool</td>
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<td>6</td>
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<td>Glasgow</td>
<td>8</td>
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Total 584 weekly, of which not one-tenth can be recovered. For gilding metals by the electrolyte and the water-gilding processes not less 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 ornament has also set in, and the rose-colour varies from 7000 to 10,000 oz. per annum.

The Indies and the Ephruses were the earliest spots whence man obtained the precious metal, gold—Nubia and Ethiopia on the south, and Siberia on the north opened up to the world its treasures as a means to procure and to indulge human luxury. Europe then began to unfold her golden stores, and Illyria and the Pyrenees, together with the land of the Hungarians and many parts of Germany to the Rhine, were sought successfully for gold. On islands yielded something to the store, and then the New World of the Americans opened by Columbus a source from which the Old World was to supply its golden waste. On and on still westward rolled the golden ball, until at length it rested in California and Australia. Rush equally to that new El Dorado, and the man of China is found at the side of the English gold streamer. Then, as if to double the girdle, the islands of the Pacific and our own Australia open their expanse to the precious metal.

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 of 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 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 Phænochemistry of Ores.

2. 'On our knowledge of Australian Rocks as derived from their Original Ores,' 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 Forbes, Rhine, F.R.S.

6. 'The History and Statistics of Gold,' by Robert Hunt, Keeper of Mining Records.

We subjoin an account of the auriferous rocks of Australia from the lecture of Mr. Jukes:

'In Mr. Arrowmith's map appended to the Parliamentary Report just issued, all the auriferous 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 100 miles in length, as far as far as from London to Gibraltar or the confines of Turkey, or as from London to Iceland in a straight line. The principal localities marked on this map are Grafton Range and Burnet River, north of the Condamine; Stanly Creek and parties to be regarded as containing several spots in the neighbourhood of Liverpool Plains; the Turon and Conobolas on the Macquarie, below Bathurst; the Abercrombie River at the head of the Lachlan; some spots...
on each side of Breadalbane Plains; the Breadwood and Arlenness diggings in the Shoaheaven district; Lake Eimeo in the Australian Alps; and Ballarat, and Mount Alexander and Erskine's Blackwood, north-west of Port Phillip.

"In every one of those localities granite and metamorphic rocks occur, and quartz veins are frequently spoken of. This is an important fact to bear in mind.

"The discovery of gold was first mentioned in the gold being seen in the actual rock, but in the drift clay, sand, and gravel, or lying loose on the surface of the ground. The Greenwood of gold, indeed, found by Dr. Ker, north of Ballarat, is described as a block of highly auriferous quartz,lying in a series of great rocks, 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 is composed of 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 thickness and color, which was described as having no valuable gold, and was called the 'sandy clay.' 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, soft and ashy. This was the celebrated blue clay, and was a stratum of great value.

"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 sometimes necessary to dig 20 feet before arriving at it.'

"Mr. Latrobe, governor of Victoria, describes the Ballarat diggings as carried on through—

"1. Red ferruginous earth and gravel.
2. Brecked yellowish and red clay.
3. Black sand, associated to by brown and greensand, and void of any ironstone set in very compact clay, hard to work.
4. Blue and white clay.
5. Pipe-clay.

"In some workings the pipe-clay may be reached at the depth of 10 or 12 feet, in others not at 30 and upwards."

"To enter farther into the details of the several diggings would be alike tedious and useless. I must refer you for them to the reports of the season, from the first of December to the 1st of February and the other in June, and to the many small publications with which the shops are now swarming.

"My object to-night has been to give you such a rough sketch of the geology of Australia, and of the geological facts and circumstances of the gold diggings; especially the record of the quantity of gold, as 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 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 therefore give up or despise altogether. You go out to dig for gold; do not be ashamed to dig for anything else. I speak to those who have been hitherto unaccustomed to manual labour. Recollect, it is the avowed object of your voyage, and the only thing you have to trust to. If you fail to dig up gold there are lands to be ploughed, sheep to be bred and sheared, cattle to be tended, corn to be sown and reaped—every one of these, for honourable occupations as digging for gold. Go, then, with a bold and resolute heart, determined to get your living by the strength of your own arms and the sweat of your own brows; and be assured that industry and perseverance lead to fortune in Australia with fewer impediments and uncertainties in the way than in any part of the world."

Since the above was written, other districts in Australia have 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 Guinea, but its boundary is not exactly determined. Geographers state that Cape Three Points (20° 30' W. long.) is the northernmost point of the coast; but our navigators extend it farther west to the small river Ashantee, which is about 180 miles from the coast, and nearly 70 miles E. from Cape Lahoo. On the east, the mainland edge of the river Lagos (4° 20' E. long.) is generally considered as constituting its boundary towards Benin, though the mouth of it is an area of uncertain boundary, as shewn on the name of the Slave Coast. In the interior are the powerful kingdoms of the Ashantees and Dahomey, on which most of the small states along the coast are dependent. According to Governor Hill, in his dispatch to the Secretary of State for the Colonies, transmitting the 'Black Book,' the whole of the territory under British protection is estimated to include about 5000 square miles of country, with a population of about 400,000. In a dispatch of April 10th, 1853, however, Governor Hill stated that the 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 12,434l., 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 60,000l., and to 110,000l. for the year 1855 to 200,000l. The chief article of export is palm-oil.

Nearly in the centre of the coast is the fortress of Accra. The country west of Accra has an undulating surface, with a small proportion of level ground; the hills are covered with shrubs and trees, and the surface comparatively level; the soil is black and high, is rocky and bold. At Accra the low country begins, and extends a considerable way to the eastward. It is a fertile, open, and level plain, which contain extensive savannahs covered with high grass; but in some parts it is thickly wooded with fine trees. The shores here are flat and sandy. There are no harbours along the coast; and as the surf is very violent, the trading vessels are obliged to anchor four or five miles from the beach. This coast was formerly much frequented by the American and English traders, for slaves. At present it is visited by a few vessels for palm-oil, gold, and ivory; they give in exchange fire-arms, iron, and ironware, tobacco, rum, Manchester cottons, and some other articles.

The whole of this coast being near 6° N. lat., is considered one of the hottest countries on the globe; yet the mean temperature is only 75°, and in the cold season the thermometer sometimes falls to 70° or 74°. During the Hamattan season of December, January, and February, the sky is as dreariest and coolest part of the year, the wind blows from 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, and the worst time of the year for residence. The winds are then than at other times, and generate fevers. In October and November showers of rain are frequent. Except during the Hamattan 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 seasonings. This fever in many instances proved fatal; but it is strictly that of late years has shown a prudent person to get the quinine has been found exceedingly useful in promoting to the recovery of persons attacked by the fever.

Cape Coast Castle is the principal English fortress; it is situated in 5° 30' N. lat., 1° 15' W. long., and covers a considerable area. It is armed with seven guns for officers of the 60-pounders, 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 outports called Fort William and Fort Victoria. The town is both strong and commodious for a place of considerable extent; it has about 10,000 inhabitants, of whom 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 163 boys.

The other forts are Accra, Annamaboe, and Divoce. 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., 1° 18' W. long, and the station is regarded as one of the most healthy on the Gold Coast.
Coast.

Two insurmountable barriers barred its entrance at Accra in 1854. Several unsuccessful attempts were made to suppress the second insurrection. Near Accra is the Dutch fort of Crevecoeur. About 3 miles E. from Accra is the fort of Christiania, and about 30 miles N.E. from Accra is the fort of Fredensborg, both recently purchased from the Danes by the British government. The purchase was made on condition that the British should be allowed to embrace the area of territory under British protection. Annamboe 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 the implements of British manufacture. The goods of a useful description, besides arms, gunpowder, spirits, and wines. Annamboe is an entrepot of commerce for Ashantees and the interior. Diyarro is situated in 4° 45’ N. lat., 1° 57’ W. long. The British have fitted up a dock for vessels of 100 tons to take in their cargoes. The native population inhabiting the town is about 1200.

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 dispatches of successive governors of the colony, addressed to the Secretary of State, it would appear that considerable progress has been made in communicating to the natives the benefits of an English education, and of an industrial training. In the year 1823 the Wesleyan chapels were attended by upwards of 6000 persons, and about 1200 children were in attendance at the schools of the mission. Mr. Freeman, the missionary superintendent, established in 1851 an industrial school and girls’ school, 10 miles from Great Castle House, near Accra. 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 vines and 3000 coffee plants. We have indeed made great progress, and I trust we may be able to increase these, and to afford the natives means of building and clothing themselves, and in general to promote their well-being efficiently and speedily.” The Wesleyan Missionary Society expends about 5000l. a year on the Gold Coast Mission. Among other evidences of advancing civilization may be noticed the erection by the natives of many neat cottages for the residence of the missionaries, with the most evident pretension to the conveniences and comforts of 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 Domonaa, the second town of the Abrab tribe and district, in the Cape Coast territory. In some of the principal towns of the interior chapels 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 kind of college, including a constable, with a missionary executive at its head. Each chief has agreed to pay a tax of £5 yearly for each person belonging to his tribe: from the fund thus provided each chief is to receive a stipend equal to the dignity of his position, and from it is to defray 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 84 scholars, and he 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 coast-guard of 253 non-commissioned officers, rank and file, in executing works of public utility, giving them the opportunity of attending the regimental school when they can spare the time from other service. In this way many members of the corps have made considerable progress in reading, writing, and a knowledge of 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 Ashante; and a fine carriage-road to Annamboe was in process of construction in April 1853. On this road a handsome bridge has been constructed. It enters the town, the granite for which had been first quarried by the soldiers from a deposit opened by them in the immediate neighbourhood.

GOO.

In actions for the non-delivery of goods, the plaintiff, if successful, may now have the same alternative judgment as in the action of Detrussion (S. 3) ; 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, viz. the writ of detrussion, and the form of Detrussion, is added by the Martensdale Law Amendment Act 1855, 19 & 20 Vict. c. 97.

GOOLE. [YORKS.]

GOOSE-GRASS. [CALIMUM, S. 1.] A grass, of small stems, of a yellowish-green, with a yellow tinge, and the flowers belonging to the order Polyphylloa, and the type of the family Gorgoneae. It has the following generic characters:—Polyphylloa-mass rooted, arborescent, consisting of a central axis backed with a polypodiferous axis; the axis horny, continuous, and brown; the stipes spiny, the otona, or cymes of the axis, stout, at times, when soft and fleshy, when dried porous and friable; the oriches of the polyphylloa-cells more or less protractant. The species of Gorgonius thus defined are not numerous. Dr. Johnston enumerates four species as being found on the British coast.

G. verrucosa, the Warted Sea-Fan, is somewhat fan-shaped, much and irregularly-branched, the branches cylindrical, flexuous, backed when dry with a white warty substance, obtuse. remarks on this species are made by Prof. E. Forbes and Mr. M'Andrew in the sound of Stye, where they found it attached to stones in 30 fathoms water.

G. plumonarias, irregularly branched, the branches disposed in a dichotomous order and a flatish form, cylindrical in the outer stem, but appearing as simple, terminal, surrounded at top by little spine. This is the Warted Sea-Fan of Ellis, and is found on the Cornish coast, but is rare.

G. anceps, the Sea-Willow of Ellis. It is branched, dichotomous; branches of this species was dredged by Prof. Forbes, and is often found in the sound of Stye, and also in Shetland. Turgeon, from the Ural, seems to be identical.

GRAINING. [LIOCRUSIS.]

GRAMINACEA. [GRAMINACEAS.] The following list of British genera is from Babington's "Manual of British Botany."

Dipteria. Signet.
Avena. Phaloria.
Barbula. Scirpus. Scirpus.
Sputa. Elymus. Lepturus.
Spergula. CCanadianus. Anthracenthrum.

G. frutetum has been found on British coasts, but it has been undoubtedly accidental.

(Johnston, British Zoophyta.)

GOTHITE, A Mineral, to which also the name Lepidolite is given. It is a hydrous peroxide of iron, differing from the brown iron-ore 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 3; and its specific gravity 4 to 4 9. It is found basaltic rocks of the same age, but in Cornwall, also in Siberia. Turgeon, from the Ural, seems to be identical.

GRATING. [LIOCRUSIS.]

"The family is very numerous. Pennou's " Synopsis of British plants contains 812 species, 1-26th part of all the plants there enumerates. In the system of Roemer and Sclater, we find, for instance, that perhaps the just proportion will be as 1 to 20 or as 1 to 16. Greater still will be their proportion to vegetation is general when the number of individuals is taken into account, for it
this respect the greater number, may perhaps the whole, of the other classes are inferior. With regard to locality in many cases maize being raised in this form belong Portuguese, Spain, part of France on the Mediterranean coast, and further, the countries of the East, Persia, Northern India, Arabia, Egypt, Nubia, Barbary, and the Canaries Islands; in these latter countries however the culture of maize or rice is perhaps not so extensive as in the European countries. In the temperate zone 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 is no doubt the vegetation of the manners and peculiarities of the people. 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.

2. The leaves of the tropical grasses are broader, and approach more in form to those of other families of plants. Of this the genus Paspalus affords many examples.

3. Separate sexes are more frequent in the tropical grasses, and in the American species, Paspalum, Glyceria, Ischaemum, Gulippe, and many other genera which only occur in the torrid zone, and are found there in perfection, are monocous or polygamous. Holcus is perhaps the only extra-tropical genus with separate sexes.

4. The extra-tropical grasses on the contrary far surpass the tropical in respect of the number of individuals.

5. That compact grassy turf, which especially in the colder parts of the temperate zones in spring and summer composes the green lawns and pastures, is almost entirelywanting 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 temperate zones in leas, is incomparable. "Arundo donax" by its height reminds us of the Bamboo, Suckernum Rubrum, S. Teneriffi, Imperata arundinacea, Leymus croats, Leymus aperati, and the species of Andropogon, Glyceria, etc., by separate sexes exhibit tropical qualities. The grasses are also less greedy, and meadows more 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, but also by the condition of the soil, the traffic of the people, and often on historical events. Within the northern part of Europe agriculture is found only in a few places. In Siberia grain reaches at the utmost only to 60°, in the European part of Russia to 72°, in the upper parts of the Kamtschatka there is no agriculture even in the most southern parts (51°). The polar limit of agriculture on the north-west coast of America is to be somewhat higher, for in the more southern Russian possessions (57° to 68°) 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, a part of Siberia and Scotland, their chief vegetable nourishment. Rye is the best, and is most frequently cultivated. In the zone where rye prevails 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 second class, best cultivated in Eastern Asia where rice is also raised; in their most widely distributed form bread. The middle and south of France, England, part of Scotland, a part of Germany, Hungary, the Crimea, and Caucasus, as also the lands of middle Asia, where agriculture is followed, belong to this zone. Here the rice is also broad; wine is also cultivated and beer is consumed less raised. Next comes a district where wheat still abounds, but no longer exclusively furnishes bread, rice more, and maize belonging to this zone belong Portuguese, Spain, part of France on the Mediterranean coast, and further, the countries of the East, Persia, Central India, Arabia, Egypt, Nubia, Barbary, and the Canaries Islands; in these latter however the culture of maize or rice is perhaps not so extensive as in the European countries. In the temperate zone of the old continent, in China and Japan, our northern kinds of grain are very infrequent, and rice is found to preponderate. The cause of this difference between the east and west is no doubt the vegetation of the mangers and peculiarities of the people. 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 is, without doubt, historical, for Asia is the country of rice, and America of maize. In some situations, especially in the humid regions of 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 kinds of wheat which the inhabitants use 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 (Convolvulus Batatas), the root of which and the fruit of the Pisang (Pomacea Musa) furnish universal subsistence, the same zone in Africa, Doura (Sorghum), Pisan, Manihot, Yams, and Arachis hypogaea; in the East Indies and on the Indian Islands, Ensete cornace, E. stricta, Ficus carica, and in the South Sea, Sago, Pisang, Yams, Batatas, and the Bread-Fruit (Artocarpus incisa). In the islands of the South Sea, grain of every kind disappears, its place being supplied by the broad-fruits, the pisang, and Taucis rensilida. In the tropical parts of Australia there is no agriculture, its inhabitants living on the produce of the sago, of various palms, and some species of Arrum. In the high lands of South America, there is a distribution similar to the last, and hence it is probable that it was indeed grown to the height of 7929 feet above the level of the sea, but only predominates between 3000 and 6000 feet of elevation. Below 3000 feet it is associated with the pisang and the above mentioned vegetables, while from 3000 to 9200 it is cultivated in Europe and the United States, in the lower regions, yas and barley in the higher, along with which Cheneapodium Queisco as a nutritious plant must also be enumerated. Potatoes alone are cultivated from 9200 to 12,990 feet. To the south of the tropic of Capricorn, wherever agriculture is practised, considerable resemblance with the northern temperate zone may be observed. In the southern parts of Brazil, in Buenos Ayres, in Chili, at the Cape of Good Hope, and in the temperate zone of Australia, wheat predominates; barley, however, and rye make their appearance in the southernmost parts of these 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 Acrostichum furfuraceum as the main article of sustenance. Hence it appears that in respect of the predominating kinds of grain, the earth may be divided into five grand divisions, or kingdoms—the kingdom of rice, of maize, of wheat, of rye, and lastly of barley and oats. The three first are the most important, and the greatest, but rice may be said to support the greatest number of the human race. Schow, in Jamieson's 'Philosophical Journal.'

The uses of this most important tribe of plants for fodder, food, and clothing are legion. The abundance of wholesome succulents contained in their seeds renders them peculiarly well adapted for the sustenance of man; and if the Cereal Grasses only, such as Wheat, Barley, Rye, Oats, Mais, Rice, and Guinanes corn, are the kinds commonly employed, 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 \textit{Lotus temulentus}, a common weed in many parts of England, the effects of which are undoubtedly injurious, \textit{Bromus pungens} and \textit{catharticus} are said to be emetic and purgative; \textit{Bromus mollis} is also said to be poisonous; and \textit{Festuca quadriglumis} is said to be poisonous. \textit{Muscus nigricans} 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 \textit{Echinochloa crus-galli} on the Coromandel coast, and \textit{Najas Ragaee}, or Mand, elsewhere in India; \textit{Setaria Germamica}, yielding German millet; and \textit{Paniceum frumentaceum}. There are many other species.

The value of grasses as fodder for cattle is hardly less than the value of grain. The best 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 \textit{Lolium perenne}, \textit{Phleum}, and \textit{Festuca praetexta}, cultivated, and various species of \textit{Fusco} and \textit{Fusco}. The fountain-grasses of Brazil are of far more gigantic stature, and perfectly tender and delicate. In Australia the favourite is \textit{Antirrhino australis}, or Kangaroo Grass; in India \textit{A. citrata} is also in request; but the most common Indian fodder-grass is Dooba, Doorwa, or Hurryalee (\textit{Cynodon dactylon}). Ganna grass (\textit{Tripsacum dactyloides}) has a great reputation as fodder in Mexico; and attention has lately been directed to the Tusac grass of the Falklands (\textit{Festuca feliciana}), a species forming tusfs five or six feet high, which is 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 beneficial to the smell of aromatic secateurs, which have in part recommended grasses to the notice of medical practitioners. Sugar is a general product of grass. It exists in great quantities in the Sugar-Cane (\textit{Saccharum officinarum}). Maize so abounds in it, that its cultivation has been proposed in lieu of the sugar-cane.

For economical purposes Grasses are often of much importance. The strong stems of the bamboo are employed instead of timber and cordage. The cuticle of some species contains silky, which occurs in large masses after the burning of a heap of corn, or a stack of hay; in the shape of a colourless glass mass.

(Lindley, \textit{Vegetable Kingdom}; Babington, \textit{Manual of British Botany}).

GRAYHOUND. [GRAYHOUND.]

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 Sept. Miles</th>
<th>Population in 1853</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Greece (Hellas)</td>
<td>Athens</td>
<td>82,975</td>
<td>3,358</td>
</tr>
<tr>
<td>1. Thessaly</td>
<td>Larissa</td>
<td>90,000</td>
<td></td>
</tr>
<tr>
<td>2. Peloponnesia</td>
<td>Nauplia</td>
<td></td>
<td>10,159</td>
</tr>
<tr>
<td>3. Achaia and Elis</td>
<td>Patras</td>
<td></td>
<td>11,757</td>
</tr>
<tr>
<td>4. Arcadia</td>
<td>Tripleia</td>
<td></td>
<td>11,713</td>
</tr>
<tr>
<td>5. Messenia</td>
<td>Kalamata</td>
<td></td>
<td>86,139</td>
</tr>
<tr>
<td>6. Laconia</td>
<td>Sparta</td>
<td></td>
<td>90,569</td>
</tr>
<tr>
<td>Islands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Euboea and Sporades</td>
<td>Chalcis</td>
<td>64,821</td>
<td>1,855</td>
</tr>
<tr>
<td>10. Cyclades</td>
<td>Hermopoli (Syr)</td>
<td>134,508</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>55,255</td>
<td>900,878</td>
</tr>
</tbody>
</table>

GREEN IRON-ARTH. [MINERALLOGY, 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 modeling, and his tastes were carefully cultivated; but it was not till he was about fifteen that he began seriously to contemplate the adoption of sculpture as a profession. Sculpture had then few practitioners in America, and none of any mark; Greenough took the hint of his Roman uncle to study the art. Rome continued to be his residence for some years, and he has since derived much professional advantage from the friendly services of Thorwaldsen. 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 that period is his colossal statue of Washington, which now stands in the grounds of the Capitol at Washington; and, the 'Rescue,' or, as it is sometimes termed, the 'Pioneer's Struggle,' now in the Capitol itself: both of these works were executed in the Etruscan style. The work of originality and power, is intended to typify 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 figures in a purely ornamental style, and in 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 return to Europe. But his works, done in the Italian climate, and his constitution proved unable to withstand the variations of an American one. After a severe illness he died December 18, 1852.

Greenough will probably not ultimately rank among the foremost of modern sculptors, but he occupies, and will no 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 were not limited to sculpture: he was an excellent draughtsman; he wrote well both in verse and prose. In private life, while thoroughly unassuming, few men have been more esteemed.

GREENOCKITE. [MINERALLOGY, S. 1.]

GREEN, JOHN EDGAR, architect, claims to be 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. Green was born in 1833 in Scotland, and was educated at Dumfries. He received an excellent general education at Edinburgh, and acquired his first professional knowledge from Mr. Walter Newall, architect, at Dumfries. About the year 1856 or 1857 he went to Manchester, where he was for some time an assistant to Mr. Mowat, and to 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 Green commenced practice on his own account, and who by his energy and exertions raised himself into a prominent position. His works include several churches and schools in the neighbourhoods of Manchester, Bolton, and Preston, and the chapel of the Diocesan Training School at Chester—those being in the medieval style. The church of St. John the Baptist in the Presbyterian churches at Green-Hays and Ancoats, school to the latter, and the Jews' school at Cheetham Hill—all is the style of Northern Italy; several private houses at Manchester, and neighboring towns; warehouses (the class of buildings which, it is said, the architect of Manchester is supposed to have designed) the lodges to the public parks 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. vii.), where also is a view, or an elevation, of one of his warehouses (vol. viii.). The bank is designed in an adaptation of the Venetian Italian style,—with careful attention to beauty of detail. The new Manchester Institute, completed at Manchester, from his design, has been mainly carried out under Mr. Cornum's superintendence, since the death of the original designer. Grecian died suddenly, after a short illness brought on by over-exertion, on the 26th of April 1855. He was a Fellow of the Institute of British Architects, Honorary Secretary to 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 a skilful performer on one or two musical instruments.

GREGORY XVI., Mauro Capellari, was born September 18, 1785, at Belluno, in the Lombardo-Venetian kingdom. He entered at an early age into the Camaldolese order of monks. His knowledge of modern languages was so great that he was elected their vicar-general. On the 21st of March 1825, Lea XIII. created him a cardinal, and soon afterwards appointed him prefect of the college De Propaganda Fide. Under Pius
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venturing at one time, and rendering abortive at another, the repeated attempts of the royalists to open a communication with the English. The battle itself, in a military moment, seeing the republican infantry waver, Grouchy leapt from his horse, placed himself at the head of a few hundred grenadiers, charged the Vendeens, and in spite of a wound he received, pressed them until sunset. In December 1793, on account of his nobleness, he was removed from his command; but his soldiers having heard of his intended departure, flocked to his quarters to prevent it, and Grouchy had to rebuke their attachment, and recall them to obedience. For a short time he was restored to his former command of the Loire, and approached the district in which he was residing, Grouchy mingled in the ranks of the national guards as a private soldier, and assisted in repulsing the enemy. His retirement lasted but eight months. In September 1794, he was restored to the command of the Loire, and on the 11th of June 1796, confirmed him in his post of general of division, to which the soldiers themselves had raised him. Carnot, shortly after, offered him the command of the army of the Côtes de Brest. The republic had, at this juncture, three armies operating against the royalists, and Grouchy feeling that a divided command would injure the service, declined the offer, and recommended that General Hoche should be placed at the head of the three armies. When the battle of St. Cyr took place, Grouchy defeated Charette in his intrenchment at St.-Cyr; and soon after the Vendéan chiefs, Charette and Stafflet, were taken prisoners. At the beginning of 1797 Grouchy was appointed second in command of the army under Hoche, intended to invade England. A detachment of his army dispersed by a tempest, was compelled to regain the coasts of France. Early in 1798 he was ordered to Italy to join Joubert's army, shortly after commanded by Moreau, under the latter, he joined the army of the Rhine, and at the head of a few troops, he took part in the celebrated campaign of Piedmont, where during six weeks 35,000 French soldiers held their ground and manoeuvred in presence of the Austro-Russian army of 80,000 men. Grouchy afterwards distinguished himself at the battles of Piacenza and Castiglione, and on the 7th of July, 1810, he defeated General Bellegarde on the banks of the Bornais. At the battle of Novi, in which Joubert was killed, Grouchy shared with Péronn against the division of the left wing, took 1,800 Austrian prisoners, and charged the enemy eleven times at the head of his dragoons; but being placed between two fires, he fell from his horse, with fourteen wounds, and was taken by the Austrians. The Grand-Duke Constantine sent his own surgeon to attend him, ordered his servants to wait upon him, and never left his side till he died, the accounts published, in eight parts, between 1835 and 1838, 'Rudiments Linguae Umbriæ ex inscriptionibus antiquis odatis; in 1839 'Rudiments Linguae Oscae; 'Die Münzen der griechischen, partischen und indosktyhen Könige von Bactria und K:view of the Termo, Parthia, and Indo-Skythiskian 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 head of his dragoons, and in the bold fidelity of many of his theories. The part he took in the controversy respecting the genuineness of the Sarchinuth's 'History of the Phoenicians,' has been already mentioned. [Sarchinuthia.] Grotefend has also published a history of the Lyceum at Hanover. He died December 16, 1853.

GROUCHY, EMMANUEL, COMTE DE, Marshal and Peer of France, was born in Paris, October 32d, 1766. He entered the artillery branch of the army in 1780. He was already a captain of horse in 1786. 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 espoused the revolutionary principles. In 1789, he was made the colonel of the 2nd regiment of dragoons, a few months later 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 Montesquieu and annexed to France; Grouchy, perhaps, the only man who contributed to its reduction.

Though scarcely in his 27th year, he began 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 by Charette, and by his skillful manœuvre at the head of the vanguard in the left wing he arrested the progress of the insurrection, pre-
28, 1814, at La Rothière, February 1, and at Vaucamps, February 14. His bravery and skill; at this last battle, rang throughout all France; the anger of Napoleon, which had lasted ten years, gave way before it, and Grouchy was conquered.

After the battle of Ligny, June 16, 1815, Marshal Grouchy was commissioned to pursue the retiring army of Blucher with a force of 34,000 cavalry, and 100 pieces of cannon. In one of his letters, he describes himself as posted at Wavre, and was engaged in action against the Prussian general Thielemann, 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 move forward, post himself on the enemy's ground, and 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 army, nothing was publicly said at that period against Grouchy's conduct, nor for three years after. After the second publication of Napoleon, the provisional government appointed the marshal to the united command of all the corps of the grand army; but the entire army amounted to 45,000 men. Banished by 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 Gourgas, at St. Helena, was published. In this account a charge of treachery was made for the first time against the marshal, who was then returned to France. 1816. He was reinstated in all his titles and honours in 1821, by Louis Philippe, and died at Saint-Rémy, May 29, 1847, having been sixty-seven years in the French armies.

GUAJARATE. (Baras Rice, 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 coast of the same. It lies between 13° 40' and 18° 10' N. lat., 81° 16' and 93° 20' W. long. On the S.B. it is bounded by the Republic of Salvador; E. by Honduras; N.E. by the Gulf of Honduras and the British settlement of Belize; N.W. by the Republic of Mexico; W. by Chiapa, and S. by the Pacific Ocean. The area is about 50,000 square miles; the population about 600,000.

Coast-line Surface, &c.—The general bearing of the Pacific coast from the Salvador boundary to the coast of Honduras is N. by W., and thence to the Rio Sitalapa, the boundary between Guatemala and Chiapa, it is N.W. The shore is for the most part low, the descent from the shore to the level of the sea being gradual, and the beach is from 20 to 30 miles across, being left between its base and 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 Yelapec, at the mouth of the Rio Michebon, at the S.W. end of the port of escogito, the harbour is better than a halfton, affording no protection for shipping. Ocos, further north, formed by the Barra de Ocos, is also an available port, but, owing to the absence of inhabitants, is not frequented. The low tracts along the coast are very thinly populated. On the northern coast Santo Tomas, in Honduras Bay, is a good and well-sheltered port; and somewhat inland, in the lake known as Golfo Doly, is the port of Yabal, in some respects the principal port of Central America; most of the European goods designed for this coast are from this port, and bring excellent barter for the Produce of the country. This is the chief port of the kingdom of Guatemala, and the most important port of the coast. The trade here is chiefly in textiles, and the Produce of the country is mostly from the province of Yelapec. The table-land of Guatemala occupies all the countries between the isthmus of Chiriquimia and that of Tehuantepec in Mexico; the island in the interior of the peninsulas of Yucatan, usually called the table-land of Yucatan, forms its boundary, most of the European goods designed for this coast are brought by land to Yelapec, and thence transported to the interior by mules; owing to a bar at the mouth of the Rio Doly, Yabal is inaccessible to vessels drawing over 7 feet of water.

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the city during the season from February to April; and near
the lake and several hot and mineral springs. The Rice
Michelena, four miles below the town, is a noted

Chimíte, 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
middle of the day is from 70° to 70° F. or 72°; but during
the north winds, which prevail in the days of November
and December, and in 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 5 and 7 a.m. The temperature of the lake, together
with a light southerly wind, usually starts before daybreak
in June is thunder is frequent; in August and September the Pacific coast is subject to violent storms from
the south-west. The table-land is considered to be very
healthy, but cholera is prevalent, especially among the mixed races, and is accompanied by idiozy. Earthquakes
are painfully frequent.

The soil is generally very fertile. The table-land is
nearly without trees, and even bushes, except on the declivi-
es of the highlands, which traverse it in every direction.
On the lower lands by the Pacific trees of very large size
form extensive forests, and are a source of great natural
wealth; but owing to the thinness of the population and the
want of roads, are at present of little profit. Among the
tribes of the southern part of the province, the yuca, tamarindo,
and manioca, &c. Various medicinal plants are also abundant.
On the low tract by the Gulf of Honduras there is a luxuriant
and vigorous vegetation.

On the table-land wheat and maize of excellent quality
are produced. Coffee is grown, and imported European fruits and vegetables produce well; and tropical fruits and vegetables abound.
In the lower tracts excellent rice is raised. Tobacco, cotton,
sugar, cassava, vanilla, and indigo are raised for exportation.
Most of the cacao, which forms so important an article in the
commerce of Central America, is obtained in Guatemala. The
agricultural resources of Guatemala remain however but
slightly developed. The country is thinly peopled, and
owing to its unsettled state, and the inert character of the
masses, has made little progress in the way of improving the rude systems of cultivation or introducing superior implements; and a considerable portion of the country lies almost waste. Of this unencultivated land a large part
is used as grazing ground, and a rarer large number of
sheep is kept. Sheep are reared in considerable numbers,
the wool, which is somewhat coarse, being used for the
native manufactures. The horses are small, but hardy
and handsome. Mules are numerous, being largely used for
carrying. The coffee produces amounted to 924,468
dollars; the imports to 1,524,420 dollars.

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 6,000 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 depart-
ment form the celebrated coffee region (Coffee Operations),
the plant on which the cochineal insect is produced,
grows freely and luxuriantly, especially in the town of
Amatitán, where the chief plantations: the insects come
from the red flowers of the coffee. The coffee continues for about a month. The other productions of this department are
maize and wheat, sugar and coffee, most of which however
is required for home consumption. The principal towns are
Guatemala City, the capital of the state, Amatitán, Escuintla,
and Escuintla (population 40,000). Jazapa, the seat of
the lake of the same name, which formerly depended on the
people who annually resorted to it for bathing, is now,
in consequence of the great increase in the rearing of cochineal,
a rich and thriving place, being a population including the
suburbs of upwards of 6,000.

2. Zaratepeques lies to the west of the corregimiento of
Guatemala; it contains above 1,800 square miles, and a
population of about 60,000, who are chiefly settled in its
western part, in the basin of the Petén. Escuintla is one of the most picturesque in the world, and the soil is
extremely fertile. Maize and other grains, and vegetables
and fruit in great variety, are largely grown. Coffee, cotton,
tobacco, and sugar flourish here, though they are not yet
known to any extent. The chief town is Old Guatemala, but there are
several other populous places around it, notwithstanding
the proximity of the two volcanoes Agua and Fuego, and the frequency and severity of the earthquakes with which it is
visited. The larger of these towns are Chimaltenango,
population 4,000, and Petén.

3. Sololá, the seat of the former corregimientos, contains about 4,000 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
country. Wheat, maize, and fruits are the chief products.
Sheep are bred in large numbers. Jerez 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 town of Sololá, the seat of the bishopric of the
centre of Sololá. From the midst of this lake rises the
volcano of San Pedro. The chief towns of this department
are Sololá, population 8,000, Atitlan, and Chiquimula, but
neither of them is of any importance.

4. Quetzaltenango, the seat of Quetzaltenango; it
contains above 4,000 square miles, and 70,900 inhabitants;
and is one of the most important of the departments in an
industrial point of view. It has a tolerably level surface, a
temperate climate, and a rich soil. The products are:
maize and wheat, sugar, cacao, and various fruits and vegetable,
which are largely exported to the city of Guatemala,
to Salvador, and Chiapas. Large herds of cattle and mules,
and great flocks of sheep are maintained. The capital
Quetzaltenango, population 30,000, a large portion of whom are
Indians, is the next town in importance to Guatemala.
It stands on the little river Samala, and is a large, well,
and regularly-built place. It contains a spacious church, and six
churches of smaller size, a large town-hall, a plaza, or great
square, with a fountain in the centre, has a daily market,
and is a place of considerable trade. In its vicinity is a hot spring,
which ejects the water to a height of about 30 feet. The
other towns are San Marcos, Tapachula, and Tuxtla.

5. Tolima department, lying north-east of Quetzaltenango; it contains 6,000 square miles, and is
heavily populated; the larger part of the inhabitants are
Indians. The surface is much broken; the climate is temperate
but considerably varied; the soil in the valleys, which are
well watered, produces sugar and coffee. The magueys, herbs,
and vegetables are the chief products of the soil. Sheep
and cattle are largely bred. Lead-mines are wrought by
the Indians in the neighbourhood of Chiasulá. Salt is made from
springs near Yxtiasa. The only town of any importance is
Tocotalcan, which is said to contain 12,000 inhabitants,

Divisions, towns, &c.—Guatemala is divided into seven

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wollen cloth, earthenware, and wooden utensils. The other towns are Momostenango, Guetzenetango, and Jascate-

6. Chiquimula, occupies the northern-extreme territory of the republic, on the bordering of the province of Honduras; its area is nearly 6000 square miles; its population about 80,000. The surface is considerably diversified, and in parts very fertile; the climate is healthy, brought about by the Bay of Honduras are hot, moist, and unhealthy. Tobacco, cotton, rice, and sugar are raised largely, with maize, fríjoles, &c. The sugar is grown chiefly for distillation or for making chocolate, a little for exporting drinking rum. The Indians, horses, mules, and cattle are reared in large numbers. The chief town is Chiquimula, population 4500; Acascaugastlan, 3600; Jalapa, 3200; Jilotepeque, 3200; Mita, 3300; Quezaltepeque, 4600; Zacapa, 3000; and the little port town of Yoro, 2000. There are not at present any towns in this province of general knowledge. After the death of his brother John in 1814, he assumed his brother's Christian name in addition to his own. Joseph John Gurney in 1818 became a reog-

7. Vera Pass, the largest of the seven corregimientos, comprehends the projecting tract of country which forms the 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 cultivated. The principal food is corn; and other valuable trees, timber-trees abound; the coffee, cacao, indigo, and nopal plants are said to be indigenous in the forests. In the northern part of Vera Pass is the lake of Peters. The most populous town is Coban, situated in a remarkably fertile valley of the same name; it is inhabited by 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 Salsam, population 4500, Coban, 4000; and Rabinal, 6000; but none of them call for specific notice. 

Government, &c.—According to the constitution of the 19th of October, 1851, the executive is confided to a presi-
dent elected by a general assembly, composed of the legis-
lature, which is elected by the people of the republic, 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 1,300,000 dollars. The army consists of 1000 men, with a patriotic corps and a militia of 5000 men.

The population consists of aboriginal tribes, some of whom live in a state of almost perfect independence, but the main body of the population consists 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 occupancy 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 Iturbide. On the publication of the new constitution, July 2nd, 1832, by which the federal system took place, the Province of Guatemala 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.

(Haefken, Central America; Juarrero, Guatemala; Travels of Humboldt, Dunn, Byam, Thompson, &c; Rely, Central America.)

GUARANINE. [CHEMISTRY, S. 2.]
GUAJARAJA [ELDORADO.]
GUJELPH [CANADA, S. 3.]
GUISHBOROUGH [YORKSHIRE.]
GUK-TREE. [EUCALYPTUS.]
GUN-TREE. [CASSONGEO S. 2.]
GURNEY, JOSEPH JOHN, was born August 9, 1788, at Earleham Hall, near Norwich, the country residence of his father, John Gurney, who was a member of the Society of Friends, and one of the partners of the Norwich bank. He was the tenth child of eleven children left by Mrs. Gurney at his birth. (See Gurney, Joseph, vol. I.)

Joseph Gurney completed his education at Oxford under a private tutor, without becoming a member of the university, of which however he enjoyed many of the advantages. He acquired the Hebrew and Syriac languages, and was well versed in the vulgar Greek and Latin, and was well acquainted with the principal books of general knowledge. After the death of his brother John in 1814, he assumed his brother's Christian name in addition to his own. Joseph John Gurney in 1818 became a reog-

GURNER, [DEBATE, vol. II., 1842.]
and he saved the Frenchman by Knocking down the Irishman. His prisoner guided him to a tower, where he found the secret government of the French, and several other officers, who had shut themselves up from the now victorious English soldiers. 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 seized the sword when the door was unbarred, a ball from the French sword in his body; but his arm ceased on finding himself seized by the person who had seized him, who added that he was the governor, General Burrié, and that he yielded himself the name of Lord William, with whom he found on the ramparts, who said to him, "Did you 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 carry it." The Frenchman granted 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 1814.

In 1830 he was placed on the detached list, and shortly afterwards became private secretary to the Duke of Wellington, who was in his service. He died in 1854, and was interred in St. James's Churchyard, Westminster. He was the last survivor of the eight Despatches of Field-Marshal the Duke of Wellington, G.C.B., during his various campaigns in India, Denmark, Portugal, Spain, the Low Countries, and France, from 1799 to 1816, compiled from official documents in France and in possession of Lord William Gurwood. The work extended, with a volume of index, to nineteen 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 had ever found its way into so many libraries and many hands. A second edition was called for, and an abridgment into one volume was issued to satisfy the curiosity of those who did not purchase the complete edition. The colonel had appeared to have been materially raised by the publication, and most of his popularity in later life was based on the "Despatches." Colonel Gurwood used his exertions to give his account of his publications bearing on his military career, but it 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 praised, especially among those who were in the Stem to stem, and was guilty of a breach of confidence. The whole appeared in print in "Fraser's Magazine," as a portion of a review of Captain Siborne's "History of the Battle." The reader who is curious to see what was written on the subject, in February, 1854, and in 1856, will find that he will find it word for 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 also supplied to 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 Carlistos, in which neither party gave quarter; and their mission was partially successful.

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 British fleet by the Russian fleet at the Cape of Trafalgar, who had commanded one of the storming parties, made a statement in October 1838 to the effect that he (the major) had accepted the surrender of the ship; that a sword, after it had been given, was presented to him in token of surrender; and while he was engaged with two officers who held 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 work which the people of North Africa, the first, having stated that "Mr. Gurwood, who though wounded had been 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 when the major, his sword; but the colonel had not produced any remark from that officer. A long and vexatious 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 evidence would have been 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. The major, turning over the years in 1844, the colonel found a letter addressed to Lord Wellington in 1815 by a captive French officer named Bonfili, who might, he inferred, be the person he was in search of. He made inquiries in Paris to ascertain if M. Bonfili was still alive, found that he was, wrote to him, and received a letter dated the 1st of May 1844, in which M. Bonfili 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 corresponded partially with facts mentioned in the Despatches of the colonel, but in all essential points confirmed his 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. Bonfili at his residence in the Faubourg St. Honoré, and he was a very singular affair 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 of June 1845, and was his last literary effort. On the 30th of December in the same year, in a letter to the colonel, he attributed at the inquest to the effects of the wound which he had received so many years before at Ciudad Rodrigo, he terminated his life by his own hand at Brighton, leaving a widow, the Frenchman and three children.

GUTTA PERCHA. [ISABEILLA, S. 2.]

GUYON, GENERAL RICHARD DEBAUFRÉ, was born March 31, 1813, at Walcot, 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 army at the Surgeon-General of the military department of the army, and was appointed aide-de-camp to Field-Marshal Baron Speney, commander of the Hungarian life-guard. In 1836 he received the degree of major in the army, and in 1841 he was promoted to the rank of colonel; and soon afterwards retired to the neighbourhood of Pesth, where his wife's relations resided, and where he spent his time in country occupations and field-sports.

In September, 1849, when Jellachich, the Duke of Carinthia, invaded Hungary, Guyon offered his services to the Hungarian diet, and received the appointment of Major of the Honveds, or national guards. On the 20th of September he contributed materially to the defeat of Jellachich at Sukořo. In the battle of Schwechat, near Vienna, on October 20th, Major Guyon with his raw troops achieved at Mannswhor 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 scythes 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 Gőrő's army on the march from Pesth to Upper Hungary; and at Ipolyangy (January 10, 1849), by a daring and skilful effort saved the baggage from the pursuing Ausrians. On the 5th of February, with 10,000 Hungarians, he stormed the defiles and heights of Branyisko, defended Pesth with 35,000 Austrians, and reduced the enemy's cannon and baggage to a large amount, and cleared the way for the van of the army to pass, Gőrő having vainly attempted to turn the defiles by a flank movement. At the battle of Kapolna (February 28th) he was mortally wounded. On the 31st of April he entered the fortress of Komorn with a small body of troops, though it...
was the closely besiegued by the Austrian troops, and
announced to the despairing garrison the approach of Gőrgei
with a relieving army. When Gőrgei was appointed minis-
ter of war, General Geyon for a time performed the duties of
the office, in order to enable Gőrgei to retain his command-
in-chief. On the 6th of August the Austrians and Hungarian
armies met in battle, whereafter, during the night, Gőrgei
and his horsemen could not save the Hungarian army
from a defeat. On the 11th of August Kosuth resigned his
office of governor, and named Gőrgei dictator, who on the 17th of
August forced the war by a general surrender.
Geyon, Bem, Dembinski, Knyet, and other officers who
had not been included in the surrender, made their escape
with much difficulty to Turkey, where, in defiance of the
conjoint demand of Austria and Russia, they were protected by
residing in prison. The time at Gőrgei was taken by the
Stantinopeleli by his wife, whose property in Hungary had been
confiscated by the Austrian government. He was offered and
accepted service under the Turkish government; and though
he decided resolutely to become a Mohammedan, was sent
by Damascus with the rank of lieutenant-general on the staff,
and with the title of Kourschid Pasha. In November 1803
he was directed to proceed from Damascus to the army in Asia
Minor, and reached Kars by a series of rapid journeys. There he
became a member of the chief of the military council, but without any real
command over an army of 15,000 undisciplined troops under twenty-one pashas,
each with the rank of a general. He was allowed, however,
to organize the army and to construct defences. That organi-
sation was consummated, though doubtless too hastily. He
immediately afterwards by General Williams and his officers, became a
basis for the heroic defence of Kars. He died of cholera,
October 14th, 1856, at Constantinople, and was interred
with the honour of a general at Constantinople.
(General Geyon on the Battle-Field of Hungary and Asia, by Arthur Kinglake.)

GWILT, GEORGE, architect, was well known as an anti-
quary, and for his restoration of the choir and tower, and the Library of St. Mary Overy's church, the parish church of St. Saviour's, Southwark. George Gwilt and Joseph Gwilt were the sons of George Gwilt, an architect, resident in the parish, who was surveyor for the county of Surrey, and who erected amongst other buildings, Horsemonder Lane Goul and Newington Sessions House. He died on the 9th of December 1807. George Gwilt, the elder of the sons, was born on the 8th of February 1775. He was sent to a school at Hammersmith, but was indebted for his general education mainly to his own exertions. His professional knowledge was acquired in the office of his father, whom he succeeded in practice. Prior to this however, Gwilt junior had com-
missioned his own professional course with the building, about the
year 1801, of the warehouses of the West India Docks. He
had a very marked taste for modern architecture, and of art, of which he at length got together, at his house in Union
Street, an important collection, many of the remains being found in St. Saviour's. In 1816 he was elected a Fellow of the Society of Antiquaries. In March and June of that year he
had valuable communications by him, on the remains of Win-
chester Palace, Southwark, appeared in the 'Gentleman's Magazine';
and he contributed occasionally at other times to the
same journal. In 1816 he was engaged upon the resto-
arion of the steeple of Bow Church, a work which required
much professional skill, and which he performed with strict
regard to the preservation of Wren's design. The peristyle of
columns and the obelisk had to be removed and rebuilt,
and were completed on the 11th of July 1818, when the copper vane (in the forms of a dragon) that of those long, was fixed. Very soon afterwards, the foundations of the
same church being found defective, some important works
for their maintenance were carried out under Gwilt's super-
vision; and during these works the interesting relic
remains of the original building were identified, and were
described by him to the Society of Antiquaries in June 1858,
in a paper under the title of 'Observations on the Church of St. Michael, Bow.' The beauty relating to its Original Structure,' and which paper was afterwards printed in the 'Vetusta Monumenta,' vol. 5. The restoration of the
choir and tower of St. Mary Overy's church was commenced
about the year 1826, and was completed in about two years,
with the addition of two practical skills in Italy, and we
find little to say of him till the year 1838, when the
Lady Chapel of the church last mentioned being rescued
from destruction, he undertook the direction of the restoration
without remuneration, and completed it in 1838, with the
skill which he had exhibited in the other part of the church.
Joseph Gwilt lived to the advanced age of eighty-one, occupied
in his favourite pursuits till within a few days before his
death. He had however suffered long from a painful com-
plaint, and the loss of his wife in 1832, very much depressed
him. He died on the 27th of June 1856, and was buried in the
family vault, next the choir of St. Mary Overy's Church.

JOSEPH Gwilt, the younger brother of George Gwilt, is also
mentioned, and the author of several valuable works on
architectural

GYMNARCHUS, a genus of Malacocephalous Aposei fists. The body is long and slender; the gill opening before the pectoral fins; dorsal fins running the whole length of the body, and having an attached and conical spine, a very small, with a single row of cutting teeth. G. Nitidus is the only
species; it inhabits the Nile.

GYMNEMA, a genus of plants belonging to the natural order
Asclepiadae. It has a sub-ureticulate, thorn-like, usually curved,
and glance body or fleshy tuft at the base of each filament.

G. acutiforum, Cow-Plant, or Milk-bearing Gymnema, has an
erect stem, or rather twining; the leaves are on short
stipules, broader, and acuminately, usually with several spurs;
the umbels many-flowered, shorter than the pedicels; the
throb 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 to substitute for cow's milk, and the leaves
are boiled with food.

G. tingenae is a native of Peru. It has a twining slender
stem, coriace leaves, acuminate to ovate; the umbels or
corymbos often twin, at first shorter than the pedicels, and
in length gradually elongated, the glands of the filament
are shorter than the stamens; follicles cylindrical, spout-
shaped; stigma simple, oval, mucit, crowning the tube of
the corolla, and therefore exceeding the stamens. The
flowers are large, numerous, and of a pale-yellow color.
The calyx 5-cleft to the base. From the leaves of this
plant a green dye is prepared by the Bemese. Seventeen
species of this genus are enumerated, none of them of any
particular interest.

(Gymnoglossum; Don. Diclioglossa Planta)

GYMNÉTRUS, a genus of Fisthas belonging to
the group of Riband-Shaped Asclepiapogus.

This has the following characters.—Body elongated, compressed; a single
dorsal fin extending the whole length of the back; ventral
sucking each of a single ray, only sometimes slightly and
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 this
genus, Mr. Yarrell says, "three probably 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
coast of New Holland, and there are more than once in Scotland: that of India, once on the coast of Cornwall."

G. Hawkerti (Bloth), Hauken's Gymnus, the Oval
Gymnus, the Cell Conil of Cornwall. This species has
been taken in Corwall. This species has been
drawn up by Mr. Couch from a drawing and notes of
a specimen taken in a net at Mount's Bay in 1791—••••••••••
The length without the extremity of the tail, which was
w. 8 9 feet; the depth, 10 inches; thickness, 9 inches;
width, 3 inches; with six spines on the back, short and
slender; eye large; pectoral fin round; no anal fin; the
dorsal fin reaches from above the eye to the tail. The
ventral fins are formed of four long processes, proceeding from the
rear end of the fish, in a fan-like manner. Gwilt with
the base is purple, the pectoral, crimson. The back and belly
are dusky-green; the sides whitish; the whole varied with clods
and spots of a darker green; the fins crimson." A very fine
HADLIGH. [Scot.]  
HEMATURE. [Thinus, Organic, S. 1]  
HEMATURE, a name given to certain forms of the native Peroxide of Iron. When of a red colour it is called Red Hematite; and when brown, Brown Hemitite. [Lat.]

HAILSHAM. [Snefr.]  
HAIR. [Thinus, Organic, S. 1]  
HALDANE, JAMES ALEXANDER, son of Captain James Haldane of Glenegies, Perthshire, was born at Dundee, on the 14th of July, 1765, within a fortnight after his father's death. In many respects his career was a counterpart of that of his elder brother Robert. In 1777 he accompanied his brother to the High School of Edinburgh, and subsequently pursued his studies at the university. Declining a partnership which was offered him in connection with Messrs. Coutts's Bank, London, he entered in 1786 the East India Company's naval service. In 1793 he obtained the command of the Melville Castle, East Indiaman. In September of that year he married the only daughter of Major Joss, of Culsenard, in the county of Haafs. At the close of this year he succeeded by his courage and presence of mind in quelling a mutiny which broke out in a ship which had been ordered to winter quiet, till winter and the end of the season, and which was beginning to assume an alarming app-reance. His views on religious matters becoming more decided, he at length resolved on retiring from the sea. Early in 1794 he rejoined his wife in Scotland. Soon afterwards he took up his residence in Edinburgh, where he became a member of the Free Church of Scotland, and was interested in various efforts for the religious instruction of the people. He took a leading part in the preaching tours which were undertaken through various parts of Scotland, in the establishment of Sunday Schools, and other Christian efforts. In December 1797, the Society for propagating the Gospel at Home was instituted. In February 1798, Mr. James Haldane became the first pastor of the Tabernacle or Circus Church. In May 1801 the congregation build a new Tabernacle, built at the head of Leith Walk, at 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 on 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 1861. Mr. Haldane published numerous pamphlets on subjects which at the time excited attention in the religious world; and found his largest sale in the Union, on which he works on 'The Doctrine of the Atonement;' '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 Trinitarians.

HALES OWEN, Worcestershire, a market-town and borough, in the parish of Hales Owen, is situated in 53° 32' N. lat., 3° 8' W. long., distant 36 miles S.E. by E. from Bewdley, 117 from Worcester, and 16 from the sea. The population of the borough of Hales Owen in 1861 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 Independent, Baptist, and Wesleyan Methodists have chapels. In Hales Owen are a Free School,
founded about 1682, which has an income of above 100l. a
year, and had 60 scholars in 1683; National Schools, and
an Infant School. Nails and hardware are extensively
made. The market-day is Monday; fairs are held on
Easter Monday and Whitsunday. Some remains exist of
an old castle called Capenhurst. It was built by King
John. Near Halés Owen is the Leasanws, the birth-
place and residence of the poet Shesnten, and the grounds
of which were arranged by him. Shesnten was buried in
Halés Owen churchyard, and the church contains a monu-
ment to him.

HALÉSWORTH. [SUFFOLK.]
HALIBUT, OR HOLIBUT. [HIPPOLOUSIS].
HALOSCIAS (Fries), a genus of Plants belonging to the
natural order Umbelliferae, and the tribe Scitellae. It
contains a species, A. ambrosioides, with a scapose
inflorescence, and a small umbelliferous fruit; and less
commonly described as A. dracunculus, with an
inflexed lobe and short claw; the fruit elliptical, terete,
or slightly dorsally compressed; carpels with five sharp
somewhat winged ridges; interstices and commissure with
many vittae; seed not cohering to the carpel, without vittae.
One species of this genus is a native of Great Britain.

H. Scoticum, Scottish Lovage, is found on rocks on the
seacoast of Scotland and Northumberland. It has a her-
beaucoup stem, tinged with red, from 18 to 18 inches high.

HAL-FIR.
HALTWISTLE. [NORTHUMBERLAND.]
HAMILTON. [CANADA, S.]
HAMILTON, SIR WILLIAM, as head of the old family
of Hamilton of Preston, in Haddingtonshire, in'heritor
of a baronetcy created in 1673, but for many years
dormant. He was born on the 8th of March, 1788, 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 length of exhibitions and other circumstances long had a
been a great source for the more distinguished among the
Glascow students: Adam Smith, among others, owed his
English education to it. As a Smaller exhibition Hamilton
got to Oxford; and he took his degree with honours as a
first-class man, printed after a long and arduous
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 incident on him, will in, after some
years, he was appointed Crown solicitor of teinds or tithes.
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 Uni-
versal History, the name univ'rous in his appointm'nt,
little more than nominal in respect of engagements, was
hardly better as to the performance of duty. The depart-
ment is not in any way imperative on students: and it never
carved single pupils, unless for a while under the elder Tyler.
Sir W. was rough without rich, and his life was con-
sumed in professional drudgery, was left undisturbed and
undiverted, to the prosecution of his studies and speculations. It
was long after these before fruits visible to any but his immediate
friends. For the digesting of his thoughts he was nearly as
independent of necessity of writing, as his iron memory
made it necessary to the preservation of his knowledge;
and the hardy, he seems to have long shrunk from the toil of despera-
ting to extend ideas, for which he did not hope to find an
apt and ready mind to appreciate. It was only, as he himself
declared, on the pressing request 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 1839, and which unfortunately constitutes as yet
by much the larger proportion of his published writings.
These 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 them justice.

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
University. He was, very few of the Scottish professors
holding offices thus designated, but there was none in both a
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 them 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 mind. In the current of his practice, of combining the whole matter of his instructions
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—the
Letters and Metaphysics; the next year he declined to
the gratification of debating, after a whimsical squabble,
an attempt of the town council, who are the legal administra-
tion of that university, to force him into the common practice.
His reputation and influence required that he should take
an active part in the discussions of the Lothian Club, which
had become celebrated in the learned circles of Germany,
in Germany, and had begun to be known and esti-
mated by many at home: the most eminent foreign thinkers
had concurred with not a few of our own, in pressing emin-
cently the extraordinary gift of his claim to the Logic chair;
and in England, as well as in Scotland, philosophical speculators
discovered more and more plainly that, in those fragmentary
treatises of his, there had been opened veins of thought which
think men durst not leave untied. His teaching, again,
not only lent itself with ease and ardour to the multifarious
gathered round him in his lecture-room. There is no evi-
dence indeed that his logical lectures have as yet had much
effect on his personal pupils. But the metaphysical lectures
excited a keen interest in the more advanced students who
were qualified for severe abstract thinking; while they
guided the thinking of not a few to channels in which it
long or always continued to flow. He was, too, not too
anxious in encouraging and directing for the young men who
philosophized as well as he, and in teaching them to
awake philosophical reflection and reasoning.

Sir William's studies seem to have been conducted,
thenceforth, with a steadier view than before to systematic
exposition and publication. Still the labour proceeded slowly.
And the larger part of the years which followed the
controversies, were somewhat too apt to interrupt the progress
of one who was armed for warfare less ignoble. Among
other things, he, himself a Presbyterian, published a pamphlet on
the Reformed Church which was printed in 1837. It was
genius to publish the 'firmament of Scottism.' Very soon,
and, afterwards, he became the vice-president of the
college. In 1837 or 1838, he was made a member of the
college. In 1841, he was made a member of the
parliamentary house, and was afterwards able to
parlamentary house, and was afterwards able to
parlamentary house, and was afterwards able to
parlamentary house, and was afterwards able to
parlamentary house, and was afterwards able to
parlamentary house, and was afterwards able to
his own doctrines which he had there promulgated, but in a tribute to the memory of another of his celebrated masters, from whom he had neither derived, nor professed to derive, much if anything in his own opinions. He undertook to edit, with notes, the collected works of Degauld Stewart. The work for that purpose began in 1836, is still uncompleted; and nothing has appeared of the biographical introduction which he intended to deduce it. In 1866, when in country-quarters, Sir William suffered fracture of a limb; and he died in Edinburgh on the 6th of May, 1866. He has left a widow and family. The name of Mugran rather than Sir William is 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 his character, it is to the details of his writings which had personal bearings, will do positive injustice to the real likeness of his personal character. He was undoubtedly a stern, and keen, and often eager controversialist, occasionally a hasty one; in debate never beat about for smooth words; and, absorbed in his love for science and learning, 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 the attempt to exclude his name from the register of the Royal Society of Edinburgh, which was a form 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 added trait, a worthy friend, beloved as well as esteemed by those who were admitted to his friendship.

About his erudition there cannot well be two opinions among those who have had opportunities and competency for judging. His mere mass was a thing extraordinary: it was a mass, and a mass which the great profusion 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 mechanics 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 read in the great poets; and his historical information was unusually extensive. In philosophy he was familiar with the Greek writers one and all: Aristotle and his commentators he had probably studied more extensively and profusely than any of his predecessors. He 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. His friend, beloved as well as esteemed by those who were admitted to his friendship—

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, learning even half as great as his, united so much of real and active originality as a thinker. In the treatment of details he has a favourite manner, which often disguises his independence. He is perhaps not too sparing in the use of even the most hackneyed phrases. As if the best way of discovering philosophical truths were by deciphering them in some medieval text through the dust of centuries. He takes a pride in quietly following on some schoolman or other a doctrine of argument which many men would have been too glad to take credit for as their own; and sometimes, half-hidden in a brief note, there is given, as an obvious and matter-of-course comment on a scholastic brocad or term, some assertion which proves on closer examination to presuppose a wide process of new inference. The outlines, however, of those sections in his own philosophical creed which he has taken the trouble to expound, are laid down broadly enough to let their character be seen. Baron von Humboldt, who valued or worthless, they are at least his own,—as much 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 taken place a long time of great interreligious discussions, which travel in a track, not only at several points new in itself, but likewise, everywhere, little familiar to most thinkers in this country. Hamilton's writings are Ger- manic rather than national. They are in a language in freedom 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 ex- pression. The richness of his speculations is, in a certain respect, characteristic: it is distinctly 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 criticism be free from pain. He never cares for doing more than saying what he thinks, and 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 disguise to excite us; and he is not a writer of an easy, precise, dry, writer. But for such as will take the trouble to follow his course of thought, and reflect on its contents, there are perhaps no philosophical discussions, certainly none of our times, that are so suggestive of processes of thought—processes which are not confined in direction, and lofty in design and in possible result.

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 been much discussed, and have in some quarters excited a 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 two kinds of thought—real and formal. 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 Thinker's-acts and noble ideas,' 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 meagre publication from lectures, Bayes's 'New Analytic.' These materials will probably convey no distinct notion of the system, unless to readers who are familiar with the German methods of logical analysis since Kant. The leading points may be briefly set out, and then left to be briefly set out, to persons acquainted with the outlines of the science in its received forms. 1. Hamilton insists on having, in all propositions through common terms which are set forth for logical discussion, not only a thought, but a sentence in a certain form, argue as do as to subject. The point, though merely one of form, is curiously suggestive of difficulties, and hence of solutions. 2. Instead of recognizing 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 Scler.) 3. 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 syllogisms are not held to be intelligible, but only, by the extension and comprehension of terms, is worked out by him in its reference to the syllogism. This application of the doctrine has certainly not been anticipated by any logician; and, when elaborated to its results, it throws many new lights on the character and mutual relations of the syllogistic figures.

HAMMER-PUROSTALL, JOSEPH, BARON VON, was born in 1774 at Gratz in Styria, where his father held a respectable post under the Austrian government. He was educated at the Prussian Polytechnic school in Berlin, and transferred to the higher mechanical academy established by Prince Kaunitz. After having taken a part in the compilation of Meninski's Arabian, Persian, and Turkish Lexicon, he was appointed in 1796 secretary to the Prussian ambassador at Constantinople, and was afterwards sent as minister for foreign affairs. While in this employment he translated a Turkish poem on the Last Judgment, and supplied several other poems to Wieland's 'Deutschem Mercur.' In
1799 he was attached to the embassy of the learned Baron von Herbert at Constantinople, which 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, hissing cats, and other, strange, Arabic manuscripts, and other rarities. As interpreter and secretary he made the campaign in Egypt under Hutchinson, Sir Sidney Smith, and Joseph Pacha, against Menou, and in the autumn of 1801 proceeded by Malta and Gibraltar to England. In 1802 he 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 was appointed to the See of Yannina; in 1811 he was appointed a state counsellor, and appointed court and state interpreter; in 1817 promoted to be imperial privy counsellor; and in 1846 created a baron, after having succeeded to the estates of the Countess von Purtschall. 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 counsellor 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 Syria, where he laboured on his very numerous literary and historical works. He died on the 15th of November, 1849.

His works are extremely numerous, and those of a historical character highly valuable. His publications of Turkish, Arabic, and Persian poems are in many instances interesting to the general reader, but his philological knowledge was not sufficiently indicated 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; 'Glances upon a Journey in 1804, from Constantinople to Brousse and Olympus, and thence by Nicca and Nicomedia,' 1818; 'History of the Assassins, from Eastern Sources,' 1816, a work which has been translated into English by Mr. Wood; 'Constantinople and the Bosphorus, together with a complete and detailed description of the city,' 2 vols., 1818, 'History of the Ottoman Empire,' in ten volumes, 1837-1834, an excellent work, of which several editions have been published; 'The Government under the Khilifas,' 1836; 'Picture Gallery of the great Muselman 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 Ikhane, that is, of the Mongols in Persia,' 1844-45. All these works are remarkable for the accuracy of the information, the correctness of the history and present state of the East. Of his other productions we may mention, 'Scherin,' a Persian poem, 1800; his translation of the 'Divan,' of Hafi, from the Persian, 1813; his translation of the 'Nasir-ol-Molk,' 700 Poets, 1818; 'The Eastern Troilof,' from Persian, Arab, Persian, and Turkish sources, 1818; 'The String of Jewels,' from Abul-Maass, 1823; a translation of the Arabic lyrical poet Motensub, 1823; a translation from the lyrical poems of Baki, 1824; a 'History of Turkish Poetry,' with selections from 2000 poets; Fasi's allegorical Turkish Epic of the Rose and Nightingale, 1834; Samaschari's Arabic poem of the 'Golden Necklace,' 1835; Mahmud Scheibserder's didactic poem, 'The Rose-Blow of Secrets,' 1836; 'The Falconer,' an old Persian didactic poem on the art of hunting, 1840; and a 'History of Arabian Literature,' in three volumes, 1850-52. He has also written a volume 'Mammon's Drick-lang,' (Mammon's Trial), containing an Indian pastoral, a Persian opera, and a Turkish 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 called the 'Oriental,' to which he contributed much, and in which he developed a new style of Persian poetry, which was continued till 1819; and he was a frequent contributor to the 'Jahrbücher für Literatur' (Year-Books for Literature), and to other periodical works. 

HARBURG, a sea-port town in 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 from the city of Hanover, and has about 6000 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, linen, and cotton. The town formerly belonged to Hamburg or Altona and brought thence to Harburg, in lights; but simultaneously with the construction of the railway from Hanover to Harburg (which, it may be added, connects the port with all the principal towns of Germany), the town has been enlarged and 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 merchandise is lifted by means of 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 Hanzburg, which 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, VISCOUNT, third son of the late Lord Plassey, of Hambly Wide, near Ashford, co. 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 located at King's Newton Hall, Derbyshire, and is said to have been related to the King of the Scots, while in possession of the Duchy of Cambridge. Having spent a short time at Eton, Henry Hardinge was gazetted ensign in a regiment of foot, October 6, 1798, obtained his lieutenancy in 1800, and captaincy in 1804. It was as his good fortune early to be selected for the service of the Duke of Wellington, then Sir Arthur Wellesley, under whom he served throughout the whole of the Peninsula War, and for a considerable time was upon the staff of the commander-in-chief; he was also for nearly the entire period deputised to consult with Sir John Moore in the field. He was present at the battles of Roliça 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 hand at Corunna, he was present at the passage of the Douro, the battle of Buceso, the lines of Torres 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 face of the enemy a considerable part was due to the brave and excellent service of his division. The influence 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 value of British troops. After this he found himself in a stronger position with the Wellington troops, and was engaged in every engagement of the war. He took part in the first and second sieges of Badajos, at Salamanca, and at Vittoria, where he was again severely wounded, and also at Pampeluna, at the battles of the Pyrenees, and at Nivelle, Nivernais, and Orthes. When he returned to England after the close of the Peninsula 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 campaign of 1814 under the Duke of Wellington, 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 he had to be immediately amputated, 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 200l. a year. On the death of Sir Wellesley Selby, he was made 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 opposition. At the latter date he returned to Ireland to hold the office of chief secretary under Earl Grey, where he remained until 1844.

Towards the close of the year 1843 Sir Henry Hardinge came to India, but did not allow further than the day, that 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 the ministers of 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 experience 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 avenged; Sir Colin Campbell had triumphantly defeated the Sikhs at Meesana and Hydroabad; Scinde itself had been annexed to our dominions; and theMaharatt war had been terminated by the submission of the Durbar at Gwalior. The governor-general, rich in the experience 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. To 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 on with himself master of the business of Sir 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 in the north; and Sir Henry Hardinge, with all his precaution, 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 plotings and counter plotings. The line of succession of the Lion of the Lion, it seemed that the controlling power had left Lahore; the young maharajah, Dhuleep Singh, a child of four years old, was, together with his mother, in the hands of the Sikhs; the Sikh solovy, who was the ruling power, was anxious to extend his dominion, and clamoured to be led against their English neighbours. Active preparations were made by the Sikhs for crossing the Suraj; 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 force of 32,000 men and 66 guns round Ferozepore, Lodianah, and Umballa. The governor-general reached the latter place about the middle of December, and, proceeding to Lodianah, inspected the various cantonments, and made himself acquainted with the military resources of the place. Sir Robert Peel, Sir Richard Wellesley, and Sir John Conolly, then a young man, and Afterwards the Duke of Wellington, Lord Hardinge trod most carefully and religiously in his Grace's steps. In 1816 he married the Lady Emily Jane Stewart, daughter of Robert, first marquis of Londonderry, and widower of the late Duke of York; and by her he had one 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 Suraj, and was also present at the Battle of Lucknow. His eldest son, Sir John Hardinge, married in 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 Hursmonceaux and vicar of Ninfield 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 1832 he was instituted to the rectory of Hursmonceaux (a living belonging to his family); in 1840 he was appointed Archdeacon of Lewes; in 1851 he became one of the prebends of the Dean of Chichester; and in 1853 he was nominated one of her Majesty's chaplains. He died at Hursmonceaux on the 23rd of January, 1855. Such are the principal external facts in the life of a man whose personal influence in his day was of very great, and who has left behind him a rich and considerable literature. His first literary appearance of any note was in 1837 when, in conjunction with a younger brother (the Rev. Augustus William Hare, M.A., of New College, Oxford, and rector of Alton Barnes, Wiltshire, who died in 1854), he published a series of learned articles in a series of periodical articles entitled 'Gueses at Truth, by Two Brothers.' (Subsequent and enlarged editions of this work have been pub-
lished; and ao a 'Second Series' under the same title).

In 1825, in conjunction with the Rev. C. Thirlwall, afterward Mr. Harriett became a pupil 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,' 1825; 'A Vision of Niebuhr's Almost Forgotten History of Rome,' Quarterly Review,' 1829; '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 Archdeaconry of Bengal,' 1840; 'The Duty of the Church in Times of Trial; a Charge,' 1848; 'The True Remedy for the Evils of the Age: a Charge,' 1849; 'Education the Necessity of Mankind: a Sermon,' 1851; 'The Contest with Rome: a Charge,' 1853; 'Vindication of Luther against his Recent English assailants (H. Hallam, Esq., J. H. Newman, W. G. Ward, and Sir William Hamilton),' 1854. From this list it will be seen that Archdeacon Hare's chief activity was in theological literature and ecclesiastical controversy. In the church, he was known as one with a high tone, as being at the head of what has been called the 'broad party,' as distinct from either the 'high' or 'low.' The liberality of his opinions in philosophy and his tolerance of religious differences may be inferred from the fact of his having been chosen as a measured experience of John Sterling, whose 'Remains' he edited, with a long and affectionate Memoir, in 1848. It was Mr. Carlyle's dissatisfaction with his memoir, as an account of his friend, that led him to write his 'Life of Sterling.' Mr. Hare's memory is held in high re estimation, not only by those who regarded him as an ecclesiastical leader, but also by many who had learnt to respect him as an earnest thinker on social and philosophic subjects.

HAMILTON, John. [Chemistry, S.S.]

HARPAGUS, William. [PULMONITIS]

HARRAR. [HUMANS]

HARRINGTON. [CUMBERLAND]

HAROLD. [BEDFORDSHIRE]

HARTE. [Mineralogy, S.S.]

HARTLEY. [Northumberland]

HASELEMERE. [Surrey]

HASSELTIA, a genus of Plants belonging to the natural order Myrtaceae, was named by Link (1749), in reference to a corolla with the tube contracted in the middle; the throat naked; the limb campanulate, 5-parted and cleft. The stamens are inserted in the throat. Anthers large, cuspidate, callose at the back, adhering to the stigmas; the ovary double, succulent; the fruit a drupe, heart-shaped. Sir Hugh North, 2, distinct, and long; seeds with a stipitate coma at the lower end.

H. arbores is found in Java, near Tjampam. It is a handsome tree, with large, elegantly formed leaves; the heart acute at each end, smooth above, paler and a little downy on the under side. The flowers are large, yellow-white, in axillary fascicles. In Java the milk obtained from the trunk by incision, mixed with honey and reduced with boiling water, is employed as a powerful draught for destroying the tapeworm; it is however apt to produce inflammation of the intestines, and in some cases has proved fatal.

HATCHEIN, Thomas. [Chemistry, S.S.]

HAY, Sir WALTER. [General, Sir HENRY, K.C.B., was born April 6, 1795, at Bishopwearmouth, near Sunderland, at which latter town his father carried on an extensive business as a ship-builder and merchant. His father retired from business in 1799, and purchased Ingress Park, Darford, Kent. Young Havelock was placed in the Charterhouse School, where he distinguished himself by his application and success, and where he had for contemporaries the Greek historians Thirlwall and Grote, Archdeacon Julius Hare, Sir C. L. Eastlake, and several others who have attained eminence in life and education. In 1813 the King chose a fession selected for him, in 1813 he was entered of the Middle Temple, and in 1814 became a pupil of Chitty. His own inclination was however for a military life. His elder brother, Col. Hay, had attracted notice by his gallant conduct on more than one occasion in the Peninsular—honorable testimony is borne to his merits

In Napier's 'History of the Peninsular War'—and through him Henry applied for a commission. In July 1815 he was made Lieutenant, and in January 1816, with his regiment in England till 1823, when having exchanged into the 13th Light Infantry, he embarked for India, and from this time his career of active duty may be dated, he being appointed a second lieutenant into the 26th Bengal native cavalry.

The Birmese having made various invasions into British territory, and collected large armies with the avowed determination of driving the English out of Bengal, Lord Amherst, in March, 1824, issued a formal declaration of war against them. The King was appointed Assistant-Adjutant-General, and in that capacity took part in the chief operations of the war. When the court of Ava was constrained to sue for peace, Havelock was named one of a commission to obtain the royal signature to the treaty which was signed at Finschharn, April 11, 1826.

Lord Cordermner having formed a military depot at Chinsurah, Havelock was appointed adjutant of it in 1827. On Feb. 9th, 1829, he married Hannah the third daughter of Dr. Marshall, the learned Baptist missionary at Serampore, with whose theological opinions his was in a great measure coincided: and it is noteworthy, as an illustration of the extent to which these to Hindoo notions has been carried in India, that it was long after made a matter of serious complaint against Havelock, on the part of the priests of Serampore, the quarters for religious worship, and the charge was greatly investigated by the higher authorities. On the breaking up of the Chinsurah depot Havelock returned for a while to his regiment; afterwards proceeded to Calcutta, passed an examination in which he was pronounced as a suitable candidate for a regimental adjutant. On the breaking out of the first Afghan war in 1838, Captain Havelock (for he had in this year, after twenty-three years' service, been promoted to a company), was placed on the staff of Sir Willoughby Cotton, and accompanied the army throughout the campaign, being present at the storming of Ghuznee, the capture of Kabul, &c. He published as account of this campaign, 'A Narrative of the War in Afghanistan in 1838, 1839, 1840,' 2 vols. 8vo, Lond., 1840.

Cotton's forces was now sent to the Punjab with a detachment, and placed as Persian interpreter on the staff of Major-General Elphinstone. On the occurrence of difficulties in Afghanistan in 1841, he joined the force of General Sale, and shared in the desperate fighting through the Khoord Cabul Pass and the difficult country beyond it to Ghuznee; in the protracted and noble defence of which fortress, as well as in the final defeat of Akbar Khan in the open field, April 7, 1842, the name of Havelock was one of the most conspicuous. Havelock was received into the brevet majority and the companionship of the Bath. As Persian interpreter he accompanied General Pollock in his march, and took part in the several encounters in which the army engaged. In 1848 he was appointed Persian interpreter to the mission which Sir John Haddo and Sir H. Haddo went out with in the winter of 1847-8, when they fought in the battle of Maharajpoor in which the Mahrattas, 16,000 strong, were defeated with a loss of about 3,400 men. In 1844 he was made lieutenant-colonel by brevet. The following year was marked by the commencement of the next war. He was present at the battles of Moodkee, December 18, 1845 (where two horses were killed under him), Fereeshah, December 21, 32, and Sobraon (where he lost another horse) February 10, 1846. When peace was restored he was appointed Deputy-Adjutant-General of the Queen's troops, at Bombay. In 1849 he came to England on leave of absence for two years on account of ill-health. On his return to India, Lord Hardinge, who had witnessed his gallant and skilful in the battles near the Sutlej, made him first Queen's General, and then Adjutant-General of the Queen's troops in India.

When the Indian government declared war against Persia, Colonel Havelock was detached with the expeditionary force under General Sir Jamset Jutiee in command of the second division of the army, and took part in the brilliant affair of Bushire, and was present at the capture of Meshanmehr. The war ended, he embarked in the Erius for Calcutta with the gallant 78th. The vessel was wrecked, April 1847, but the colonel and all the officers and several hundred of their followers were spared to do memorable service in the rescue of their countrymen and countrywomen subjected to far more fearful peril than that of shipwreck, and in inflicting retribution on their saboteurs. A noble officer of the line.

Immediately on reaching Calcutta he was detached with the rank of Brigadier-General to Allahabad. He left that
city on the 7th of July at the head of a column of about 1900 Europeans and Sikhs to retake Cawnpore, where 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 against terrible odds, but he made good his ground, and on the 16th of July he arrived at Cawnpore, after a march of about 500 miles, with only 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, which was quite blind-footed, had done in the last eight days marched 196 miles, and won four 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 forcibly murdered in Cawnpore and in the vicinity of the town, he began, on the 19th of July he again inflicted a severe defeat on the mutineers, and finding that Nana Sahib had evacuated his stronghold of Bithoor, 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 men so reduced by death, wounds, and sickness, as to render it imperative on him, after almost coming within sight of the beard that commenced his advance on Cawnpore—not however 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 comrade, General Sir James Outram, Havelock at the head of his forces proceeded on his way, but with the genius of a true-hearted soldier, 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 was about to leave his post to return to England, and call upon the government to release his brother from the cell that had imprisoned him. He then proceeded to London, and Hayden's enthusiasm showed itself without a bound. For a time he did scarce anything but draw, write, and talk about them; and to the last he was glad to believe that to his earnest pleas with men in power the purchase of them for the nation was partly due.

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. 'Detustus' was the subject chosen by him next year; and from this period Haydon dates the commencement of his "career." He was accused of liberality or mismanagement in hanging his 'Detustus' where it could not be seen, and of a want of historical painting as the cause of their refusal to admit him as an associate, while they admitted less skilful artists. The next work he exhibited was "Christ and the Woman of Samaria," and 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 Hayden's enthusiasm about them was boundless. For a time he did scarce anything but draw, write, and talk about them; and to the last he was glad to believe that to his earnest pleas with men in power the purchase of them for the nation was partly due.

Haydon was refused further 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 introduced a lasting ill effect on his fortunes. From this time his life was 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 Maccabell, and his 'Judgment of Solomon' was bought by Mr. Elford and Mr. Tingcomb for 700 guineas; his 'Alexander returning in triumph, after vanquishing Bucephalus,' found a purchaser at 500 guineas in the Earl of Eggromont; and his 'Veas and Aeschias' was purchased by Lord Maltgrave. Application for admission to the Academy resulted again in disappointment.

His next great work was 'Christ's Entry into Jerusalem,' begun in 1819, and exhibited, and 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 'ChristRejected.' In May 1821 he married. His 'Raising of Lazarus' was painted in 1823. About 1815 he had two 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 at least obtained success. He had at one time a large school, but in the end he had none, and was only left with a sort of small miserable school. His last work was connected with the Academy. He painted several pictures for the Royal Academy, and was a member of it, and became an inmate of the King's Bench prison. Here he founded a subject for a successful picture in the 'Mock Election,' which took place within those walls in July 1837. George IV. purchased this work. Haydon exhibited under the subject in his 'Chariot of the Members,' which was sold for 300 guineas to Mr. Francis of Exeter. He had previously regained his liberty with the assistance.
of friends. Another picture of the same period was his 'Pharaoh dismissing Moses after the Passover,' for which he offered 1,000 guineas from Mr. Hunter, an East India merchant.

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 Act, 'The Duke of Wellington at Waterloo,' which he had succeeded in getting for 40 guineas. He returned, however, after a time he was able to effect a settlement with his creditors. 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 so adornning 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 and engaged in the business. In the vehicle in favour with the authorities, he set himself eagerly to the preparation of a cartoon. The judges gave in their decision for four copies of his, and then the question of the successful competitors, even of the third class. It was a death blow to all his hopes; and though he struggled bravely against the disappointment, he never really recovered the shock. His last work was done at the time of the first landing of the Prince of Wales in the Gulf of Botany; for the Marquis of Hertford, the Prince of Wales, who was afterwards appointed to the commissariat charge of a brigantine. After having been taken out of the hands of James Vesuvius, who had the commission for the whole, he was sent to Lake Huron to superintend the commissariat department of a naval establishment intended to be formed on the Canadian lakes. Peace however was soon afterwards made with America, and in ten months he was again in England. In 1833 he was appointed professor of art in the Royal Academy in Halifax, in 1834, and 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 Wides of North America, being a Diary of a Winter's Tour from Halifax to the Canadas, and a Four Months Residence in the Woods on the Borders of Lakes Huron and Simcoe, by George Head, Esq.,' 12mo, London, 1839. In 1831 he received the honour of knighthood. Encouraged by the publication of 'A Home Tour through the Manufacturing Districts in England in the Summer of 1836, by Sir George Head,' 12mo, 1836, which was followed by another volume, 'A Home Tour through various parts of the United Kingdom,' 12mo, 1839, he published 'A Home Tour through the Manufacturing Districts: also Memoirs of an Assistant-Commissioner General, by Sir George Head,' 12mo, 1837. The first Tour includes most of the largest manufacturing towns in the north of England; 'Isle of Man, part of Scotland, the Channel Islands, 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 written in a spirit of curiosity; the first volume was published 'Rome, 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 Racc', 12mo, 1850, and from the Latin, 'The Metamorphoses of Apollinus,' 4vo, 1851. He died in London, May 2, 1855, unmarried.

HEADINGTON. (OXFORDSHIRE.)

HEALTH, PUBLIC. [PUBLIC HEALTH, S.2.]

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, with his language, are not always suitably commensurate with his style and principles, 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 own 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 pages of the third volume of Taylor's 'Life of Benjamin Robert Haydon,' 2nd ed., 3 vols., 1853.

HAYESINE. [MINERALOGY, S. 1.]

HEAD, SIR GEORGE, Knight, was born in 1725, at the Hermitage, a few miles north from Rochester, in Kent. James Roper Head, father of Sir George Head and Sir Francis Bond Head, was descended from Fernando Mendes, a Jew, who came from Portugal to England, and was physician to King Charles II. The father of James Roper Head, married a daughter of the Rev. Sir Francis Head, Bart., and assumed the name of his wife's father.

George Head spent his early years at his father's residence, the Hermitage, and was afterwards educated at the Charter House School, London. Early in 1806 he obtained a commission in the British Navy, but having obtained leave of absence, in the spring of 1809 went to Portugal, where he accepted the humble situation of a commissariat clerk, and joined the British army under Lord Wellington. He was afterwards appointed to the commissariat charge of a brigantine. After having been taken out of the hands of James Vesuvius, who had the commission for the whole, he was sent to Lake Huron to superintend the commissariat department of a naval establishment intended to be formed on the Canadian lakes. Peace however was soon afterwards made with America, and in ten months he was again in England. In 1833 he was appointed professor of art in the Royal Academy in Halifax, in 1834, and 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 Wides of North America, being a Diary of a Winter's Tour from Halifax to the Canadas, and a Four Months Residence in the Woods on the Borders of Lakes Huron and Simcoe, by George Head, Esq.,' 12mo, London, 1839. In 1831 he received the honour of knighthood. Encouraged by the publication of 'A Home Tour through the Manufacturing Districts in England in the Summer of 1836, by Sir George Head,' 12mo, 1836, which was followed by another volume, 'A Home Tour through various parts of the United Kingdom,' 12mo, 1839, he published 'A Home Tour through the Manufacturing Districts: also Memoirs of an Assistant-Commissioner General, by Sir George Head,' 12mo, 1837. The first Tour includes most of the largest manufacturing towns in the north of England; 'Isle of Man, part of Scotland, the Channel Islands, 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 written in a spirit of curiosity; the first volume was published 'Rome, 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 Racc', 12mo, 1850, and from the Latin, 'The Metamorphoses of Apollinus,' 4vo, 1851. He died in London, May 2, 1855, unmarried.

HEADINGTON. (OXFORDSHIRE.)

HEALTH, PUBLIC. [PUBLIC HEALTH, S.2.]

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, with his language, are not always suitably commensurate with his style and principles, 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 own 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 pages of the third volume of Taylor's 'Life of Benjamin Robert Haydon,' 2nd ed., 3 vols., 1853.

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to the embryo by the venous trunk. In the bloodvessels 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 blood through them. The heart, therefore, from the first, is a hollow mass of tissue which is effectuated by a constriction round the middle of the tube; and the dilatation of the posterior portion becomes an auricular sac, and that of the anterior a ventricular cavity. Between the 50th and 60th hours the circulation of the blood in the vascular area becomes more vigorous, and the action of the ventricle is no longer continuous with that of the auricle, but seems to succeed it at a separate period. At the same time the thickness of the heart becomes more and more bent together until it is doubled to the extent of 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 is effectuated by the auricle is carried on to the ventricle in the region of the apex or point of the heart, and between the 60th and 70th 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 auricle differs considerably from that of the ventricle, the region of the heart, which is thinnest and membranous walls which it at first possessed whole 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 Mammalia. About the 60th hour the grade of development of the heart may be regarded as corresponding with that of fish, the auricle 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 horse, which consists of a membranous tube twisted on itself, and partially 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 bulbus arteriosus of fishes.

Having thus traced the evolution of the heart up to the stage which it presents in fishes, we may now inquire what is the condition of the other parts of the vascular system. At the end of the 4th 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 21st day the second arch is inclosed in a tube which incloses the pharynx in the same manner; and towards 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 branchial arteries 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 fishes, as well as by the tadpoles of the *Batrachia*. 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 neighbouring parts, and which afterwards remains as the pectoral end of the heart, ventral arch has been shown to be corresponding with the inclosing vessel from the second arch. While the first pair is being obliterated a fifth is formed behind the fourth which had 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 vas-eis of the head are now brought into connection with it by means of the communicating branches, which previously joined the third with the second arch. When these vessels are fully developed, the branchies by which these arches formerly sent their branches to the head and general circulation are extinguished 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. The arches which remain the branchial arches, that is to say, 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 become defined, and the left auricle and ventricle, the latter of which 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 be correspondingly divided into two chambers, the left auricle and ventricle, divides it into two nearly spherical sacs. Of these the left is at first much the larger, and receives the great

2 Q 2
systemic veins; the left has then the aspect of a mere appendage to the right, but it subsequently receives the veins from the middle and lower lobes, and at last acquires an increased size. The septum between the auricles 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 sinus venosus. The valve, which is often closed by the prolongation of a valvarul 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 ventricles begins a little time before that of the auricle, 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 grows firm 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-aauricular, so that the heart may be regarded as completely a double organ. 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 the division of the inter-aauricular septum is first developed, and that it is in the embryo at any instance 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 and more completely as the heart grows in the organism. 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 one another except at their bases; this fact is very interesting from its relation with the similar permanent form of the *Dipnoi* and the Ichthyosaurus, in which the inter-ventricular septum is still imperfect, so that the ventricular 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 and more directed towards the external surface, 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.

In the adult animal the distribution of the arterial trunks to their final modifications, by which the creature is enabled to become an air-breathing animal. The first, second, and third branchial arches are replaced by the brachial and coronal arteries, which join the common trunk with the primitive arterial trunk except at its commencement, when the third pair of arches arises with the other trunks from its dilated bulb. This remains a single vessel even after the ventricles have been separated. About the fifth or sixth day the bulb in the chick becomes flattened, and its opposite sides adhere together, so as to form two tubes running side by side; one of which unites with the left, the other with the right ventricle. The one on the left becomes the ascending aorta, that on the right the pulmonary artery. 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.] HEIMIA, a genus of Plants belonging to the natural order *Lythraceae*. It has a hemispherical campapulate calyx, bracteolate at the base, with six erect lobes and as many alternate broad sepals, with both the angles; this is alternate, with six 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, slender, shorter than the calyx.

*H. salicifolius* is found in New South Wales, and in the vicinity 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 mollis. and diuretic. The Mexicans consider it a valuable medicine, and call it Hanchinol.

HEINE, HEINRICH, was born on the 1st of January, 1800, at Düsseldorf, in the Prussian Rhine-Provence, of Jewish parentage. His father was deeply interested in education, and at an early age acquired an increased size. As he was intended for the mercantile profession, he was sent in 1816 to Hamburg, to receive the necessary instruction and training. He remained there till 1819, when his father, as well as his other relatives, was enabled by his attainments to wish for him a literary career, and he published his first collection of poems, "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 Sprecher* and *Jahreskalender* of 1817. He afterwards made tours to the highest points of the Alps, and after his return to Berlin published his remarks in the *Gesselschafter*. In 1823 he published his tragedy of "Almanson," together with a one-act tragedy named "William Radcliiff," and a "Lyrisches Intermezzo." While he remained at Berlin he also published in *Der Sprecher* a series of letters under the head of "Briefe aus Berlin," which attracted much attention. In 1823 he returned to Göttingen, and resumed his studies in jurisprudence. On the 30th of July, 1826, he took a degree in law. Having no disposition of establishing himself there 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 1826 to have visited Paris, and was in the vicinity of that of the New Testament, in the Lutheran form, but afterwards became an unbeliever. While at Göttingen, in 1828, he had made a tour in the Harz Mountains, of which he published an account at Hamburg, *Die Harzreise*, 1829. His after-days were devoted to literature. He continued to reside during the summer of his life. In this year he published his series of letters "On Nobility" ("Über den Adel"), Hamburg, 1831. In 1833 appeared his essays "On the Origin of the Classical Mythology," and many others. He retired to Elbing, and became a member of the Schilesische Literature, 12mo, Paris and Leipzig, and in 1836, his remarks on the state of France, "Franzosische Zeitbände," 12mo, Hamburg, which is a collection of articles previously published in the *Augusberg Gazette*. The "Salon," 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 1844, he removed to Germany for the last time. After his return 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 removed to Heidelberg, in bad health, but continued to reside at the same place till 1848, when he removed to Lon-
HERAT. [Persia.] 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 systematic Botany, 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 interested in study botany possess themselves of an herbarium more or less extensive and of the 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 are dried and 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 completer the specimens the better for study. In trees, portions of the branches, with the leaves, flowers, or fruit, should be taken, where possible, sections or small portions of the stem, 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 split to allow the paper to get into them. The_pulvinus from both the staminiferous and pistilliferous flowers should be obtained. Some plants, as species of the genus Rubus and Salix, demand that both flowering and leading shoots should be gathered. In gluing the plants on to the paper, care must be taken to avoid splitting the plants, and paper may be obtained. A sheet of varying thicknesses should be employed, and pressure may be applied by means of a weight or tramp. The latter is the most easy process whilst travelling. In order that the plants may be dry free from moisture, either by surface or internal distillation, a hibernal paper strapped between two pieces of board, into which the plants needing drying may be thrust at once.

The paper employed may be ordinary blotting-paper, but the paper-makers have made a paper for botanical use which may be more advantageously employed. In London, Dentall's drying-paper is used; there is also another paper used in Scotland, called the Edinburgh botanical drying-paper. It is made in sheets 18 inches long and 11 inches broad. This paper is of a strong and compact texture, and according to the size of the drying-paper. Several sets of boards of varying thicknesses should be employed, and pressure may be applied by means of a weight or tramp. The latter is the most easy process whilst travelling. In order that the plants may be dry free from moisture, either by surface or internal distillation, a hibernal paper strapped between two pieces of board, into which the plants needing drying may be thrust at once.

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 are so arranged that the intermediate portions as to retain them in their position. Having placed 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 same is repeated until the whole is out, the paper may be increased or diminished according to circumstances. Very succulent and wet plants require frequent changing and much drying. Most specimens will dry in eight or ten days. Succulent plants need to be killed.
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 inserted, with all 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 the margin of the wide paper, 17 inches long and 10 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 any careful spirit, or the like. The sheets may then be arranged in a case, according to their genera or natural orders.

Rita, 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 5-6 parts of water, or in alcohol. In some instances a solution of 4 ounces of bay salt, 5 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 cloth and to which is attached a label.

HERMASIA, a genus of Plants belonging to the natural order Parcenioideae. It has 5 sepals; 5 stamens inserted with the 5 stamens on a perigynous ring; 2 stigmas nearly sessile; fruit 1-seeded, indehiscent, membranaceous; leaves alternate, petiolate, entire, ovate-lanceolate, which are described in the next catalogue. Three have been recorded as natives of Great Britain. One, *H. hirsuta*, is a doubtful native; the other two are very rare.

*H. glabra* has a prostrate herbaceous stem, with clusters of sessile flowers collaicing on the lateral branches into a 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 flowers are distinct, staminate and androecial. It has been found at Lisard Point, Cornwall.

HERMINIUM, a genus of Plants belonging to the natural order Orchidaeae and the tribe Ophrysineae. 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 and petals are very small.

HERNE BAY. [Kest.]

HERNSHAW, or HERONSHAW, a name for the Common Heron. [Heron.]

HERONS BILL. [Erodium, S.I.]

HERSCHL, CAROLINE LUCREZIA, the sister of the great astronomer Sir William Herschel, was born at Hanover on the 16th of March, 1770. Till her twenty-second year she lived with her parents in her native place; after which she came over to England to reside with her brother, then established as an organist at Bath. When Sir William exchanged his profession as a musician for those astronomical labours which were to immortalise his name, his sister became his constant and most valuable assistant—first of all in the first commencement of his astronomic pursuits," says an authority who writes from intimate knowledge, "her attendance on both his daily labours and nightly watchings was put in requisition, and was found so useful that, on his removal to Datchet and subsequently to Slough, 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 diaries, as an amanuensis, but subsequent to the publication of the nebulae, she performed the 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 work. For the first part of the year 1779 she received 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 sitting up frequently all night till day-break, more especially in winter, while her brother required her help, she was able, by snatchling such intervals of time as her brother's occasional absences permitted, to conduct a series of observations of comets, &c., 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 entitled to the rewards of the Royal Society for the year 1779. The date of the discoveries of the seven comets were as follows:—August 1, 1776; December 8, 1778; January 9, 1790; December 15, 1791; October 7, 1793; November 7, 1795; August 6, 1797. Besides the discovery of these comets, she had the merit of having discovered one of several remarkable nebulae and clusters of stars, included in her brother's catalogue.

In 1798 she published, with an introduction by her brother, an astronomical work of great value, entitled 'Catalogue of Stars taken from Mr. Flamsteed's Observations, 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 561 stars observed by Flamsteed, but which had escaped the notice of the framers of the 'British Catalogue,' were discovered during the whole of her brother's career Miss Hershel remained 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 unusually prosperous in their time, owing to the value of the shares for two years of age which she left England, she lived for twenty-six years longer. Even these venerable years were not spent idly. In 1838 she completed a catalogue of the nebulae and clusters of stars observed by her brother, for which labour the Astronomical Society of London voted her a gold medal. She was also chosen an honorary member of that Society—an honour very unusual in such a case. Living in dignity and tranquility, retaining her memory and the full use of her faculties almost to the end, she survived her death from anxiety and fatigue the highest respect from the king and crown-prince of Hanover and from other German sovereigns, she survived till the 9th of January, 1848, when she died in her ninety-eighth year.

Among the female examples of the pursuit of knowledge, very few names deserve so high a place as that of Caroline Herschel.

HESKET-NEWMARKET. [Cumberl.] HESPERIDIN. [Chemistry, S. 1.]

HESPERIDES [HYPEROSTERA]. [Hyposperida.

HETEROPTERA. [Heteroptera.]

HETTON. [Durham.]

HEYTESBURY. [Wiltshire.]

HIBBERTIA. [Dilleniac.]

HIGHAM. [Leics.]

HIGHAM-PERRERS. [Northampton.] 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 fourth child, and was a nephew of the Rev. Rowland 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 38th regiment of foot. Having obtained leave of absence, he went to a military academy at Strasburg, where he remained till January 24, 1791, 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 Shropshire regiment of fencibles. He went to the Netherlands to pursue his military studies at Strasburg, but returned to England at the end of the summer, joined his regiment at Edinburgh January 18, 1792, and remained in Scotland till the end of the year. In the following year 1793 he raised as an independent company, for which service he received his commission as captain on the 23rd of March. He took his company to Ireland, delivered the men over to the 38th regiment, and returned to Shropshire in June. Lord Hood takes him to Dublin on the 17th of August 1798, Captain Hill, before
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He was attached to any particular corps, was employed to
serve as aide-camp to three successive generals, Lord M'Grave,
General O'Hara, and Sir David Dundas. On the 13th of
December, 1793, Lord Hood and Sir David Dundas appointed
him the bearer of dispatches to England, where he arrived
at the 14th of January, 1794. In the early part of that year
Mr. Graham (at that time Sir Thomas Graham Graham, subse-
sequently Lord Lynedoch) having raised a regiment of infantry,
offered Captain Hill the rank of major in it, on the condition
of his supplying a certain quota of men, which he did. This
regiment with the other, January 1, 1794, he was destined to
wear as his uniform. It was afterwards augmented to 1000
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.

Mr. Hill went through arduous duties with his regiment
at Gibraltar and elsewhere, till, on the 8th of March 1801,
he landed with his regiment at Alexandria in Egypt, as part of
the army under Sir Ralph Abercromby. He received a
wound on the temple in the action of March 15, 1801.

After the defeat of the French he returned to England,
where he arrived on the 1st of April 1802. He performed
military duty in England and Ireland till 1806, when he
accompanied the expedition to the river Waas in Ger-
many, with which he was appointed a deputy to the 1st
coast, which the insect becomes a real inactive police, with
the limbs of the perfect insect laid along the breast, as in other species
which undergo the strict coruscate species of transformation.

Mr. Beddome was the first to discover these curious particulars
and attributes of the insect from these singular eggs, that he carried them
in his pocket by day and took them to bed with him at night, in
order that they might have a uniform degree of warmth ;
and was his surprise therefore when, instead of grubs as he
expected, perfect insects were produced.

These insects are interesting in their habits. They live
exclusively upon quadrupeds and birds; the horse is espe-
cially subject to the attacks of one of these species, hence
the term Hippobosces. This species is the type of the
genus Hippobosces, in which the eyes are large and distant,
being placed at the sides of the head; the antennae are in
the shape of tubercles with three dorsal setae: the wings are
large. Mr. Curtis observes that these flies move swiftly, and
like a crank, sideways or backwards; they are very tenacious
of life, and live principally on horses, attaching themselves
to the belly between the hind thighs and under the tail,
where they are less protected by hair. It is remarked by
Latreille that the sex foams them, and horses suffer
very little from them.

In the New Forest, the Horse-fly is the most astonishing
degree. Mr. Samouelle says, "From the flanks of one horse I have obtained six handfuls, which con-
sisted of upwards of a hundred specimens. They abound
most on white horses and ponies."

The other genera are: Ornithomyia, Craterina, Oxy-
pterum, Hemorota, Melophaga, Feronia, Lipotaspis,
and probably Brusa. Of these the first three are British,
and are found upon various birds, the Craterina birudula
depositing its eggs like a cocoon in the nest of the swallow,
where it receives all the necessary warmth; for which it
repays the poor swallow by sucking its blood. The wings in
this genus are very long and narrow. The genus Melophaga
embraces a single species, Melophaga cariosa, which is destitute of
wings, and attacks the sheep. It is of a dark reddish colour,
with the abdomen whitish. It is commonly called the
Sheep-Louse, and is so tenacious of life that Ray states
that it will exist in a fleece twelve months after it is born,
and can menstruate, and lays a tinge to the wool, which is very
difficult to be disengaged.

Hippoglossus. [Phlebotominae.] Hippuricus Acid. [Chemosian, S. 2.] Hiricus. [Oed.] HISTOLOGY (teve and Orke), that department of science
which embraces the facts relating to the ultimate structure of
the parts of plants and animals. These facts have
been comprehended under the term General Anatomy,
more recently they have been classified under the term Histology. It is only recently that this word could be
needed, for the observations upon which the science
has been founded have only been made since the extensive employ-
ment of the microscope. It may be said to have originated
with Marcello Malpighi (1628-1723) and Grew (1641-
1692), and Wren (1628-1723) at the time when magnifying glasses
were first constructed of such a kind as to be useful in observing
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 Fabrius, at the beginning of the 17th century, went even further by thinking that all the tissues were made up of minute structures which were the same throughout the body. 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 Leuwenhoek, we do not find them dealing with a minute structure of the tissues till the beginning of the present century. We can only point to such men as Fontana, Muy, Lieberkühn, Hewan, and Prochaska, as having engaged in isolated observations upon the structure of various tissues. One 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, in Vegetation, published in Müller'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 granulose substance, and around them the cell-nuclei (cytoplasm) are found, which appear like granulose 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 was rapidly developed, and we cannot more appropriately present it in the condition in which it has been by the labours of Professor Kölliker, in his introduction to his Manual of Histonology:—

"In the year 1835, in fact the demonstration by Dr. Th. Schwann, that the perfectly identical cellular component of all animal organisms, and of the origin of their 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 field, and what Schwann has been doing, with regard to physiology and medicine, and in fact of great value in a purely scientific point of view, inasmuch as a great deal which Schwann only indicated or shortly adverted to, the general 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 has not amounted to a step so greatly in advance as to constitute a new epoch. If, without pretensions to preeminence, it be permitted to speak of future, this condition of Histology will last as long as no essential modification of the rod towards 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 the facts, such constitute the cell, can be discovered, 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 these elementary parts.

"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 aspects which the elementary parts present to observation, namely, their form. If, in the answer must be made of the connection between what is the 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 as far as they are to be found in 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 it, 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 need is to have as broad and certain an 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 process by which the elements have 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 dis-
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velop from these their higher elementary parts, stands firm; though it must not be understood as if cells, or their deriva-
tives, were the sole possible or existing elements of animals. In the same way, Schwann’s conception of the genesis of cells, though applicable to organs and parts of their molecular forces, after the manner of Donders, Dubois, Ludwig, and others, combined with a more profound microscopic exami-
nation of them, such as has already taken place with regard to the muscles and nerves, and further, a histological treat-
ment of embryology, such as has been attempted by Retkerti, Vogt, and myself, will assuredly raise the veil, and bring us 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 to be consulted on this subject.

Kölleri, Manual of Human Histology; Sharpey, General Anatomy, in Quain’s Elements of Anatomy; Beale, The Microscope and Its Application to Clinical Medicine; Todd and others, on Anatomy; Gerber, Elements of the General and Minute Anatomy of Man and the Mammalia; Goodall, Anatomical and Pathological Observations; Hassell, Microscopic Anatomy; Bowman, On the Structure of Voluntary Muscles (Phil. Trans., 1840); Kienan, On the Surface of the Brain and Spinal Cord; Manual d’Anatomie Générale; Mohl, On the Vegetable Cell; Owen, Lectures on Comparative Anatomy; Quækett, Lectures on Histology; Schleiden, Principles of Scientific Botany; Schleiden and Sachs, Comparative Botanical Researches (Sydney, 1874); Cyclopedia of Anatomy and Physiology; Robin, Histoire Naturelle des Végétaux Parasiitaires; Carpenter, Principles of Physiology, General and Comparative. (Quarterly Journal of Microscopical Science.)

BIBLIOGRAPHY. [HOBSON.] HOLLIBRIDGE, [P. B.]
HOLIBUT, or HALIBUT. [P. F.]
HOLLYHOCK. [A. T.]
HOLMAN, JAMES, known as The Blind Traveller, was born in or about the year 1787. He entered the royal navy in December 1798, and was appointed lieutenant in April 1807. At the age of twenty-live an illness which resulted from his professional duties deprived him entirely of his sight. On the 29th of September 1812, he was ap-
pointed Commodore of the Mediterranean Squadron, and there are six, with a governor. 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 an account in the British Magazine. 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., Svo. 1822. On the 19th of July 1822, he embarked on a voyage to St. Petersnburg, whence he proceeded to Mos-
cow, Novgorod, and finally to Irkutsk, the capital of Eastern Siberia. After four months, he reached Tientsin, and began sufficiently firm, 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 further, and he was compelled to return. He was commissioned 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 in the Years 1825, 1826, and 1827, at the Expenses of the Royal Society of London;’ also, during the years 1823, 1824, and 1825, 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. Svo, 1825. But though Travels were intended, as he states, to have been the commencement of a series of travels and voyages round the world, which it afterwards accomplished, and which occupied about five years. After his return he published 1 A Voyage round the World, including Travels in Africa, Asia, Australasia, America, &c., from 1827 to 1832; 4 vols. 8vo, 1834. In this ‘Voyage’ he visited the islands of Madeira, Teneriffe, and the western coast of Africa; thence he crossed the Atlantic to the west coast of South America, and turning north, calling some time in Brazil, he recrossed the Atlantic to the Cape of Good Hope, and visited Caffraria, Madagascar, Mauritius, and Ceylon, whence he passed to Hindustan. He next passed by the Straits of Malacca to New South Wales, Van Diemen’s Island, and returned over the south side of Cape Horn to England. In 1843 he visited Dalmatia, Montenegro, Bosnia, and Servia, and passed in 1844 by Moldavia into Transylvania. Lieutenant Holman’s series of voyages and travels is no less remarkable for the much interest when they were published, chiefly from the extraordinary circuit of the world having been accomplished by a man who was totally blind, but they are, as might be expected, of little value for any information which they contain. He died July 30, 1857.

HOLCANTHUS. [CLEISTOGON.]
HOLSWORTHY. [DEVONSHIRE.]
HONDURAS, Republic of, of Central America, occupies the elevated country between the table-land of Guatemala and the plains of Mosquitos and Nicaragua. It lies between 14° 5’ and 16° 30’ N. lat., and about 86° and 92° W. long. of Cape Horn; but a narrow tract extends southward between Salvador and Nicaragua as far as the Gulf of Conchagua on the Pacific, 13° 30’ N. lat. Honduras is bounded E. by the Mosquito district, S. by the province of Cortes, W. by the republics of Nicaragua and Salvador, and N. by the state of Veracruz. The surface is about 30,000 square miles; the population is about 250,000, of which about 150,000 are Indians. The capital is Trujillo, the river of the same name, which is merely a stream rising in a bay formed by 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 peopled. 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 insalubrious influence extend far inland.

The surface of the country is greatly broken. It may be described as a table-land traversed by several ranges 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 point is on the southern slope of the Sierra de Tamaulipas, near the shores of the Caribbean Sea a ridge of mountains, the Sierra Omoa, 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 Congroy, 875 W. long., which is 7000 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 are intersected by few rivers, the longest of which is the east. Near the western end of the state are the broad valleys of the Chamalicon and the Uina, which are overgrown by thick forests of mahogany, cedar, and fustic trees. Along the southern side of the territory there is a river which divides the waters which flow into the Pacific from those which fall into the Atlantic; but only a few peaks attain any con-
siderable elevation. From this ridge, and from the transverse ridges north-west of it, a series of high and steep hills rise perpendicular from a broad depression, and form 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 coast of the Chipas, which rises on the Merendon Mountains near 14° N. lat., and flows generally northern direction into the Bay of Honduras a little east of Pinta 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 Chamalicon is impeded by a bar at its mouth. The navigation of the Ulus is much smaller and more important. It is formed by the union near Santiago 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, enough for navigation in the long, straight coast line. 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 Aguan, which after a course of about 100 miles discharges itself by two branches into the Caribbean Sea, about 30 miles each, and is the last of the long, straight coast line of the province. Towards the south-eastward, and along the north coast, are several narrow valleys, 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. Goitre is common in the elevated districts. The valleys opening to the sea are very fertile, but moist and unhealthy. Those from which the air of the sea is impeded by the hills are less so, and their soil is more habitable, but their fertility is not so great. On the tableland, 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 are received, there being a few rainless days during the month of June. Thunder is frequent, and is followed by long and heavy rains. But even during this time it rains only in the evening and night: from six o'clock in the morning till four or five o'clock in the afternoon, no clouds pass over the sky, and there is dry and pleasant. Towards the middle of October the north winds set in with frequent thunderstorms, and after them the dry season begins.

The most important natural productions are the vast forests of mahogany, cypress, pimento, and numerous other valuable trees; but owing to the badness 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, sorghum, cotton, tobacco, plantains, bananas, and various fruits and vegetables are the principal articles grown, 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 market of the province is Comayagua, which occupies nearly the N., and contains the capital of the republic: Gracias to the south-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: Tegucigalpa is on the north-west of the province. All of the provinces are very hilly, and are divided by several narrow valleys, 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.

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Divisions, Towns, &c.—Honduras is divided into seven departments—Comayagua is the most important. It contains the capital of the republic: Gracias to the south-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: Tegucigalpa is on the north-west of the province. All of the provinces are very hilly, and are divided by several narrow valleys, 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.

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thermometer seldom rises above 83° 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, until the country, a woody region, is almost entirely being engendered by the marshy miasma arising from the swamps. The soil by the coasts and rivers is a rich alluvial deposit, and very fertile. On the higher ground the country is divided into patches of the most luxuriant growth, and the logwood-tree abounds in the swamps. Ceder and other valuable timber-trees are among the natural products.

The plantain is extensively cultivated. Maise, ne, cassava, arrow-root, yams, &c. are grown. Cotton, sugarcane, tamarind, and tobacco are cultivated, and on the coast, the woods the red tiger, the black tiger, the tiger-cat, the leopard, and other wild animals, and game, are found. Turto abounds on the keys.

Hornby is governed by a Superintendent, and a Public Meeting, consisting of seven magistrates appointed by the inhabitants. The superintendent is immediately subordinate to the Governor of Jamaica, from whom he holds a 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. However, the Williamsmoor prison, in the parish of Morant Bay, which has been called New Gaol, to which afterwards he made alterations costing 40,000L. on its conversion for the cellular system. In London he was the architect of Roger's Club-House in St. James's-street, the Naval and General Life Insurance Offices in Chandler's Wharf, 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, belongs. His last work, St. Mary's Hospital, Paddington, which is inferior in character, and perhaps understood by him greatly, was opened in 1839. To this latter he added alterations totalling 30,000L. and another for a column of Victory to be erected in India with 12 columns in successive tiers, from the base upwards, of the shaft.

Although not possessing those high qualifications in art and science which the architect now strives to bring to his profession, Hopper's life is not the less an important one in the later history of architecture. He lived to enter the eighty-first or eighty-second year of his age, dying on the 11th of August 1856 at his cottage, which had been built by him, at Bayswater in life. In his possession a frame which could support almost any amount of fatigue,—and although he was contemporary with the less esteem of the Englishman, he never drank anything but water. He practised athletic exercises with Jackson the boxer, and was active in command of a company of the volunteers. His features and form have been exactly given by Mr. J. Tennouth, the sculptor in the relief on the eastern compartment of the Church of St. Peter's Column, to the sailor who is supporting a wounded boy. He was always connected with the leading personal characters of his day, and this circumstance afforded him inestimable service. He was the friend of a number of eminent men of business and the house of knighted, but this he declined, as well as offers from Alexander I., emperor of Russia, and the Duchess of Oldenburg, for him to settle at St. Petersburg. The obituary notice in the 'Builder' (vol. xiv., p. 481)—the facts of which are not clearly apparent, like those above, derived from family sources—calls him 'a man of mark and power,' a conclusion...
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 'academick.' His figures are almost always well drawn; of elegant proportions; have the established 'classic' contour and expression, or absence of emotion; are clothed or partly clothed, in a more conventional 'drapery' which nymphs and goddesses, whatever 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, as they are shown to us in the 'Sun' ('1760), to afford a pleasing flow of lines and 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 'academick' pictures, and they are no more. Always strictly attentive to the forms and proper members in whatever can be a 'Venus rising from the Sea,' a 'Love animating the Statue of Pygmalion,' or a cold 'Primavera Hope,' can that by any chance give the slightest shock to the nerves of the most susceptibility—who is not shocked by any undraped female beauty. But if his "beauties of fair forms" are never like those of Etti trebling on the verge of the voluptuous, they never like them are buoyant with the exuberance of life and youthful vigour—never exhibit the firm and wide and pleasing flow of lines and 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. Seymour 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 several years previously its active duties were performed by an assistant. He died on the 9th of October 1847.

The titles of a few of his pictures will sufficiently indicate the range and character of his subjects. Of his sculptural paintings, the most ambitious are 'Christ blessing Little Children'—perhaps as an altarpiece in the chapel in Little Berkshire 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 him 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,' 'Proserpine,' and large stock subjects; but a large number consists of figures floating in the air with such titles as the 'Pleasures,' the 'Solar System,' the 'Circling Hours,' 'Morning,' 'Night,' &c. Besides numerous pictures from Singer, his favourite poet, Milton, Shakspere (especially the Midsummer Night's Dream') &c., he is said to have gone through the works of the etchers on the Grand Tour. He is said to have collaborated with a great many artists that on the occasion of the first cartoon competition in 1843, he did not shrink from entering the lists, though then seventy-three years of age, and in the nude encounter with the young artists fresh from the schools, his cartoon, 'Man bested by contending Passion,' carried off one of the premiums of 100l.

In 1814 Mr. Howard won the prize for a medal for the Patriotic Society, and thenceforward he was generally employed in preparing the designs for the medals and great national events. He also received the especial commendation 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 Dilettante Society, and designs for bookplates; he also painted some portraits. His first contribution to the Royal Academy, 'Beasts and Ancestors' and the 'Planes of the Sun' were much admired by persons of classical taste; and from this time for more than half a century Mr. Howard continued, without a single intermission, to send to each annual exhibition some painted or etched designs of the classes of which these may be taken as the types. In fact the number of pictures which he executed, though illustrating themes from the Scriptures, and from Greek, Roman, Italian, and the
It has opposite, stalked, broad, cordate, or oval leaves, not at once at the base, pointed, membranous, smooth, from 2 to 3 inches long; petals from 1 to 3 inches long; umbels lateral or axillary, simple, many-flowered.

Flowers numerous, green, with pedicles as long as the peduncle. Corolla flat; crown of appendages turbinate, truncate. The public house house of a standing ship, which is divided, horizontal, obtuse, about 3 or 4 inches long, and 4 inches in circumference. The root and tender stalks produce nauseas, and promote expectoration. The leaves peeled and dried in a basket are used by the natives of India as a diuretic in the early stages of jaundice. As to the manufacture of gunpowder, they are employed in the same way to promote suppuration.

Several species of this genus are cultivated in our gardens on account of their elegant flowers, which, from their curious wasp-shaped emblems, have been named by the Botanical emblems of the pea family. They are a genus of Leguminosae. 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 most rudiments of education, including Latin and a smattering of Arabic, at a 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 obtained his seat in 1799, he proceeded to the University of Surravas, where he was appointed surgeon to the East India Company in 1797. He distinguished himself not only in his medical capacity, but also by acting as purser on his voyage out, and conducting a most complicated business in a very successful manner. He was afterwards made a regular interpreter, and in addition to his duties as a surgeon, he became Persian interpreter, commissary-general, and paymaster and postmaster of the forces in the prize agencies.

It is said that he owed the first step of his progress to this superiority in chemical knowledge. He learned a method of detecting the presence of damp in the government stores of gunpowder on the eve of Lord Lake's Mahatta war. Nothing is more surprising than the amount of hard work performed by him, which is fully attested by his letters to his family. He was so well acquainted with Place, Mill, and other disciples of the school of Jeremy Bentham; and devoted considerable time and energy to the foundations of savings banks and of schools on the Lancasterian system. He was also a candidate—though an unsuccessful one—for a seat at the Board of East India Directors. In 1818 he re-entered parliament as member for the Montrose burgh, for which he continued to sit without interruption until 1830, when he was chosen by the constituency of Midlothian. He represented that county during the whole of the period of agitation which preceded the passing of the Reform Act and down to 1837, when he was defeated, but he was returned through the influence of Mr. O'Connell for Kilkenny. In 1841 he contested Leeds without success; but in 1848 he went to the contest, and was elected for the Montrose burgh, which he represented down to his death, a period of thirteen years.

For many years Mr. Hume stood nearly alone in the House of Commons as the advocate of Financial Reform: indeed in the public expenditure, no man ever did so much practical good as Joseph Hume, through a long career of perseverance and industry. Disregarding the fashion of the age and the opinions of the world, he distinctly extended the public expenditure of the country and right. In most of the political and social movements of the last quarter of a century he was an important actor: the working man eat bread which he helped to cheapen, waits through parks which he helped to procure for him, and in a sea of plenty the month is a month. The authority of his decisions on his exertions. He more than once refused to accept office under Liberal governments, and he devoted a part of his own wealth to the social and political objects which he had in view. His speeches devoted to the interest of farmers occupy in bulk several volumes of "Hansard's Debates." He incessantly advocated reforms in our army, navy, and ordnance departments, of the Established Church and Ecclesiastical courts, and of the general system of taxation and the early days of the war, he brought to efficient service a military flying, nautical improvement, and imprisonment for debt. With little active assistance, he carried the repeal of the old combination laws, the laws prohibiting the export of machinery, and the act for preventing mechanics from going abroad. His opposition to the use of colonial and municipal abuses, election expenses, the licensing system, the duties on paper and printing, and on articles of household consumption. He took an active part in carrying Roman Catholic emancipation through both the House of Commons and the Lords, 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 minutest of detail, will be found in Miss Harriet Marri- nnan's "History of the Thirty Years Peace."

The health of Mr. Hume began to break soon after the parliamentary session of 1864, and he died at Burnley Hall, near Huddersfield, on the 20th of May, 1865. At the time of his death he was a magistrate for Norfolk, West-minster, and Middlesex, and a deputy lieutenant for the latter county. As a proof of the esteem in which he was held, we may add, that in the House of Commons he was the only speaker of the House of Commons who spoke of "the 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. HUMPHREYS, ACID. [CHEMISTRY, S. 1.]

HUSBAND. [DICTIONARY, S. 2; SEPARATION, JUDICIAL, S. 2; WIFE, S. 2.]

HYACINTH. ST. [CANADA, S. 2.]

HYAENACHE, a genus of Plants belonging to the natural order Thalia. Hyaenachne, is a genus of Polyphyletic Animals, including the Fesh-Water Hydra, or Polyple. It has the following technical definition.—Polyplecrops locomotive, single, naked, gelatinous, subcylindrical, but very contractile and mutable in form; the mouth encircled with a single series of granulated filiform tentacles. As of all the forms of Polyphyletic animals the Hydro is the most interesting, we give an abstract of their history, from Dr. Johnston's "British Zoophytes":

Leeuwenshoek discovered the Hydra in 1703, and the uncommon way its young are produced; and an anonymous Aborigines of South America were discovered 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 estab- lished 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 society were daily experimen- ting on the creature and transporting it by careful posts from one to another, while even ambrosialsm were for- getting to the respective order of early intelligence in the engraving theme. The Hydro 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 size. Some of them can contract into a minute top or button, and when extended it becomes a nar- row cylinder, being ten or twelve times longer at one period than another, the tentacels changing in size and form with the body. On the point opposite the base, and in the centre of the tentacles, there is a little opening or aperture, which leads into a wider cavity, excavated as it was in the middle of its body, and from which a narrow canal is continued down to the sucker. When contracted, and also when about to change in size, a kind of "middle degree of extension" the sides seem to be minutely crenulated, an effect possibly of a wrinkling of the skin. The tentacels encircle the mouth and radiate in a star-like fashion; but they seem to originate a little under the lip, for in a very short time the mouth is surrounded by a circle of tentacles, which are cylindrical, linear, or very slightly tapered, hollow, and roughened, at short and regular intervals, with whorls of
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tubercles, which under the microscope form a very beautiful and interesting object.

The central part forms a slender membranous tube, filled with an albuminous nearly fluid substance, intermixed with some oelaginous particles; and at certain definite places this substance swells out into tubercles or denser wart-like nodules, which are arranged in a spiral line. Every nodule is furnished with a hollow tube or spind as organ of touch, and with a very singularly constructed organ for catching the prey. The organ of touch consists of a fine sac, inclosing another with thicker paries, and within this there is a long ciliated hair. From the two prongs of the cilia above there projects a long cilium, or capillary spine, which is non-retractile and apparently immovable. Surrounded by these cilia, and in the centre of the nodule, is placed the captor organ, called the 'basta'; this consists of a long outflattened sac-like nodule, imbedded in a small aperture even with the surface. At the bottom of the sac, and within it there is a sucker-like vesicle, on whose upper depressed surface is seated a solid ovate corpuscle, that gives origin to and terminates in a calcareous sharp arrow, 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 sagittes are protruded, by which means the surface of the tentacula is roughened, and the prey more easily caught, as the sagittae being in the same time injected—a conjecture offered to explain the remarkable fact of the almost instant death of the prey. The nodules of the tentacula are connected together by means of four white threads, which unite, forming, moreover, shell-less spaces by their intersections. These are the extensor muscles of the tentacularum. They are again joined together by transverse fibres, which Corder believes to be adductor muscles, and to have also the power of shortening the tentacularum. But whether these are the muscles of the apparatus of itself sufficient to effect the wonderful extensibility of these organs—from a line, or, as in H. fusca, to upwards of eight inches—and to produce this degree of elongation, it seems necesary to have superposed the propulsive agency of a fluid. Water fibres, such as may by swelling into the stomach through the oral aperture, whence it is forced by the vis-a-tergo, or drawn by capillary attraction, into the canals of the tentacula, and its current outwards is sufficient to push before it the soft yielding material of which they are composed, until at last the resistance of the living parts suffices to arrest the tiny flood, or the tube has become too fine in its bore for the admission of water attenuated to its smallest possible stream;—it is inconceivably slender may indeed be imagined, but there is no room for it strong enough to equal it, seeing that the tentacula of H. fusca, in the transparent, can be compared to nothing groser than the visible filaments of the goosebird's web.

The tentacula, usually found attached, can nevertheless move from place to place, which it does either by gliding with imperceptible slowness on the base, or by stretching out the body and tentacular to the utmost, fixing the latter, and the contracting the body towards the point of fixation, loosening at the same time its hold with the base; and by reversing these actions it can retrograde. Its ordinary position seems to be pendent, or nearly horizontal, hanging from some floating leaf or weed, or stretching from its sides. In a glass of water the creature will crawl up the sides of the vessel to the surface and hang from it, sometimes with the base and sometimes with the tentacula downwards; and again it will lay itself horizontally. Its locomotion is very slow, and the disposition of the scopheus is evidently sedentary; but the contortions and nutations of the body are a little vivacious, while in seizing and mastering its prey it is surprisingly nimble, seizing a worm with as much eagerness as a cat catches a mouse. It enjoys light, and expands more freely under its influence; hence we generally find the Hydra near the surface and in shallow water. The Hydra are very voracious, feeding only on living animals. In composition, however, Trembley found they might be fed on minced fish, shell-fish, and mutton. They will sustain long fasts with no other food. Small worms, crustacea, and insects seem to form a favourite food. Sometimes two polyae will seize upon the same worm, and most amusing is it then to watch the exertion and struggle of the two, sometimes seeing the weaker polyae growing the weaker polyae by the stronger, which however is soon disregarded with me other less than his dinner. This is more curious when contrasted with the fate of the worms on which they feed. No sooner are they seized than they evince every symptom of painful suffering, but their contortions, instead of being relaxed, more tenderly follows their capture. How this effect is produced is still a matter of conjecture. Worms are in ordinary circumstances most tenacious of life, and hence one is inclined to think that, at least in the Hydra, the worm is lost in the Hydra's grasp. To the Entomatostrachus the touch is not equally fatal, their shells evidently protecting them from the poisonous secretion. The Hydra is chiefly celebrated on account of its manner of propagation. It is like scopheuses and cladii, but is distinguished by the power of continuing and multiplying its race, principally however by the process of subdivision. During the summer season a large tubercle arises on the surface, which lengthening and enlarging every hour, in a day or two develops in the middle a small aperture, through which the tubercle, and becomes in all respects except in size similar to its 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. Two or three are known to arise from the same parent, and forty-five young ones in two months. In autumn the Hydrae generate by internal oviforin gastræalæ, which issue from the body, and lie during the winter in a quiescent state, and issue at the first warmth of the spring. Few observations have been made on these ova, so that their structure, source, manner of escape, and condition, are scarcely known.

These are the moles in which the Hydrae naturally multiply, and can be increased by artificial sections 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 be divided into four or eight or even minuted into forty, each portion will grow, and develop into a perfect Hydra, which 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 speedily reunited into a perfect whole, or if the pieces are kept saunder each will become a perfect poly. If the tentacula 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 off the body the wound speedily heals, and as if by instinct new tentacula are produced, by which polypae sprout from the wound more abundantly; when a poly is introduced by the tail into another body, the two unite and form one individual, and when a head is lost, if the polyae are not lost, new polypae issue from the new head, which may chance to want one. And the creature suffers nothing itself by all these apparently cruel operations; for before the lapse of many minutes the upper half of a cross section will expand its tentacula and catch prey as usual, and the portions of a longitudinal division will after an hour or two take food and retain it. A polyt poyl cut transversely in 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, polypae produced in this manner grow much larger and are far more prolific in the way of their natural increase than those which were never cut. When such pieces were cut off the body and immediately put together, the walls of the polypae were so thin that the new polypae were not clad round a very small and slender worm, but seemed to pech it fast till they could master and devour it, which they did
with as much greediness as any. It was first observed in England in the spring of 1743 by Mr. Ducane of Essex. It appears to be a hardy animal, and is easily kept for a long period of time in the water.

_H. vulgaris_ is of an orange-brown or yellowish colour, body cylindrical, tentacles 7 to 12, as long or longer than the body. It is found in muddy ponds and slowly-running waters of small size, which it resembles in its habits and form. It is always of an orange-brown or red colour, the intensity of the tint depending on the nature of the food, or the state of the creature's nutrition. Every part of the body is generative of young, which are frequently seen being born from the parent at the same time in different stages of their growth.

_H. attenuata_ is of a light oil-green colour, the body attenuated below, with pale tentacles longer than itself. It is found in ponds, and in Yetholm Loch, Roxburghe. This is a larger animal than _H. vulgaris_, and comparatively less sensitive to external impressions, and of a more graceful form. Its colour is a pale olive-green, with paler tentacles, 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. viridis_. Dr. Johnston says he has not observed more than one young at a time, which pulsatiled from near the middle of the body, and after this has attained a certain growth the polyp has the appearance of being dichotomously divided.

_H. oligactis_ (Polypes a Long Bres de Trembley) is brown or rufescus; inferior half of the body suddenly attenuated; tentacles are more than twice the length of the body. It is found in still waters in England, rare. In a pond at Hackney, and in a pond at Cranmore, near Bath, 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. vulgaris_, and have seldom more than 6 or 8 arms, but those capable of great extension. It may be worth while to call attention to the remarkable resemblance of the Hydra fusca to the Osellina cirrosa of Müller, which is an intestinal worm.

(Johnson, History of British Zoophytes; Landborough, Popular History of British Zoophytes; Trembley, Memoires pour servir a l'Histoire d'un Genre de Polypes d'Eaux douces, the Hague, 1743; Baker, Natural History of the Polype.)

HYDRIDE. A family of Snakes belonging to the Cucumis sub-order of Dr. J. E. Gray's arrangement, and the Cucumis. This does not exist, which includes the Hydroiza and Boida. [Boa.] It is thus characterised—Belly covered with narrow elongate shields or scales, nearly resembling those of the back.

The following is a synopsis of the genera, and a list of the species, compiled from the Catalogue of the specimens of Snakes in the British Museum:—

**Hydrida.**—The ventral shields narrow, hexagonal or band-like; the hinder limbs not developed; the eyes and nares superior, vertical, the latter valvar, generally placed in the middle of a shield, with a slit or groove to its outer edge;fangs moderate, intermixed with the maxillary teeth; pupil small, round; tail compressed or conical. They live in the sea or salt-water lakes, or in fresh water.

Synopsia of the Genera.

1. Tail compressed (except in _Aerchordus_). Belly keeled, with two rows of small scale-like shields, often united together in a single, rather broad, 6-sided shield.

4. Head shielded to the nape. Nasal shields very large, with their hiperculated, superior, nasoral nostril on the outer edge; the 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 aseep on the rocks where they are easily caught, for they cannot descend into the sea without throwing themselves on to their backs. This arises apparently from the necessity of expelling the air from their large lungs. They are often thrown ashore in the surf, and are occasionally caught by waders who 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 _Hydrias (Peleamis) bicolor_ is said by Cuvier to be eaten at Tahiti.

a. Scales square or 6-sided, placed side by side.

* Head elongate, depressed.

1. _Peleamis._

_P. bicolor._ Pacific Ocean. For figure see _Hydrias_.

_P. ornata_. Borneo.

** Head moderate, rather compressed; gape moderate.

2. _Lopemis_.—Head moderate, short, rounded in front; dorsal scales square; ventral shield broad, 6-sided.

_L. curvata_. Malay.

_L. Handschuri_. Borneo.

3. _Austrias._—Head moderate, short, rounded in front; dorsal scales 6-sided; ventral shield 6-sided.

_A. ornata_. Indian Seas.

_A. Belcheri_. New Guinea.

4. _Microphysophala_.—Head small; scales 6-sided; ventral scales keeled.

_M. gracilis_, the Kadal Nagam. Madras.

5. Scales ovate, 6-sided, imbricate, keeled, or with the keel reduced to a tubercle on the centre of the scales; head and gape moderate.

* Labial 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. _Euhydrias._—Rostral plates narrow, erect; lower linear, sunken, nasal narrowed in front; ventral shield flat; head moderate, short; eyes moderate.

_E. Bengalensis_. Madras.

_E. Volakadyen_. Madras.

6. _Hydrophis._—Rostral broad, transverse; lower triangular; nasal truncated or notched in front; ventral shield flat; head short; eyes small.


_H. Linsleyi_. China.

_H. fasciata_. Indian Ocean.

_H. nigrocrinata_. the Krell. Bengal.

_H. dilata_. the Black-Headed Krell. Australia.

_H. subcineta_. Shaw's Chittil. Indian Ocean.

_H. sublunata_. the Chittil. China and Indian Ocean.

_H. mentatis_. the Pale Chittil. Indian Ocean.

_H. occuclea_. the Eye-Head Chittil. Australian Seas.

_A. epytralea_. the Skillet. Indian Ocean.

_H. subannulata_. the Ringed Sea-Snake. India.

_H. aspersa_. the Rough Sea-Snake. Singapore.

_H. corallinae_. the Bluish Sea-Snake. Bengal.

7. _Chitosila._—Rostral broad, transverse; lower triangular; nasal truncated or notched in front; ventral shields flat; head elongate, depressed; eyes large.

_C. incarna_. Indian Ocean.

_C. fasciata_. Indian Ocean.

8. _Korilas._—Rostral broad, transverse; lower triangular; nasal truncated 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. Jordanii_. the Krell. Madras.

** Labial 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 2-rowed, forming a keeled ridge, some united in pairs in 6-sided shields.

9. _Hydrias._

_H. major_. the Sea-Snake. India; Australia.


c. Body covered with smooth polished imbricate scales; head as large as the body; ventral scales rather large, transverse, smooth, folded together and keeled.

10. _Tomogaster._—With head regular shields; superciliary shields simple; ventral shields entire.

_T. Eydonii_. Indian Ocean.

11. _Stephanohydra_.—Head shields numerous; superciliary shields 3 or 4; ventral shields nicked behind.
S. fuscus, Jukes' Hypopropaxia. 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. Cherneyrus.—Tail compressed, sword-shaped, prehensile; body fusiform, covered with small rhombic scales, with a central tubercular keel.

C. granulatus, the Cherneyrus, Madras. For figure see Livonc. C. annularis. Madras.

13. Acrochordus.—Tail conical, tapering, moderate; body fusiform, covered with cusp-shaped scales.

A. Javanica. Java.

II. Tail conical, tapering. Belly rounded beneath, with more or less broad band-like shields. Rivers or ponds.

A. Head shielded; tail scally 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. Epytonina.

14. Epyton. E. tentaculata, the Epyton. [Epytow.]

B. Head shielded; tail with two series of shields beneath; nostrils between two shields; abdominal shields broad, keeled on each side; scales smooth. Bitiana.


B. hydrostomias. C. Head shielded; scales striated, and keeled or smooth; tail conical, tapering, with two series of shields beneath; nostrils in a ring of a large nasal shield, with a groove to the outer side; ventral shields round (or rarely slightly keeled on the sides): frontal shields 3, rarely 2 or 4, all small. Cerberius.

a. Crown scaly; occipital rudimentary; frontals 4; anterior pair very small.

16. Cerberus.—Scales keeled, striped; hinder labial shield low.


b. Crown shielded; occipital moderate.

* Head distinct, depressed; frontals 4; anterior pair small; rostral rounded.

17. Narina.—Scales smooth; seventh upper labial low, with a large shield over it.

F. Sibolodi. Bengal.

** Head distinct, depressed; frontals 3; anterior transverse; rostral rounded.

† Fourth and fifth hinder labial shields small or divided.


19. Phytophias.—Scales smooth.

P. punctata. India.

+++ Hinder labial large, like others; scales keeled; rostral rounded.

20. Uranocia.—Scales truncated, strongly keeled, striated; eye over fourth shield.

U. angulas. Tropical America.


T. Leoparkina.

22. Tropopias.—Scales ovate, keeled, striated; eye over fourth and fifth shield.

T. Sibolodi, the Chitiea. Ceylon.

23. Myron.—Scales ovate, slightly keeled, smooth.


24. Heliocia.—Scales ovate, polished; of back and tail keeled.


+++ Hinder labial large, like others; scales smooth; rostral rounded.

25. Heliornithia.—Seventh labial large; eye over fourth and fifth labial; lorel distinct.


26. Parania.—The seventh labial large; eye over the third and fourth labial.

F. fasciata, the Wampau-Snake. New Orleans.

27. Hydropla.—The seventh labial large; eyes over the fourth labial; ventral shield broad; body thick; loarel none.

H. Mariti. Brazil.

28. Hygina.—The seventh labial large; eyes over the fourth labial; ventral shield narrow; body slender; loarel none.

H. fasciata. Demerras.

29. Dimodea.—The seventh labial short, small; eye over third and fourth labial; loarel none.


+++ Head moderate, depressed; frontal 3; anterior elongate, erect, between the nasals; seventh smooth; rostral rounded.

30. Forodania.—Scales broad, rhombic; ventral shield rounded; loarel none; eye over third labial.


31. Gerarda.—Scales broad, rhombic; ventral shields rounded; eye over fourth labial; loarel square.

G. bicornis, the Gerard. West Indies.

32. Hipoidea.—Scales narrow, flattened; ventral shields keeled at each end; loarel square.

H. fasciatus. West Indies.

+++ Head indistinct; frontal 4; anterior 4-sided, rather smaller; scales smooth; body cylindrical.

33. Abator.—Body cylindrical; loarel shield none; anterior frontal 4-sided; posterior ocular 2.

A. erythrogrammus, the Striped-Wampum. North America.

34. Radicia.—Head small, conical; body subspherical; anterior frontal very small, triangular; loarel distinct; posterior ocular.

R. Indica. India.

35. Miridia.—Head small, conical; body compressed; frontal plates 2 pairs; loarel none; posterior ocular 2.

M. alumnus. Java.

+++ Head moderate, depressed; frontal shields 2, small lateral; rostral shield angular, high, erect, between frontals and nasals.

36. Ficosia.—Head small; rostral plate large, produced between the frontal, angular and recurved in front.

F. cinnamomea. Mexico.

+++ Head small; frontal shields 2, transverse, band-like; rostral triangular, subangular.


D. Head covered with small scales; tail with one row of shields beneath; abdominal shield broad, rounded, smooth; nostril in a shield, anterior, subabradal; scale granular, with rows of keeled scales. Xenodermias.

38. Xenodermias. X. Javanicus, the Goniote. 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 sutures of the lip-shield, not found in other individuals of the same species.

The distribution of the colours on the body appears to be one of the most constant 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 Ophiophis, 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 Ophidiidae are of comparatively small size, seldom equaling the Boidae in this respect, and falling far short of the enormous dimensions popularly attributed to the Great Sea-Serpent.

HYDROIDAE. [Mineralogy, § 1.]

HYDROCYON, a genus of Fishes belonging to the Malacopterygi Abdominales. The species are very numerous. They have the point of the muzzle formed by the intermaxillaries, the maxillaries and premaxillaries; the eye-scales being large, the eyes, and completing the mouth, 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 Polyptera, embracing forms resembling the fresh-water Hydro in the simplicity of their organisation. The following is Dr. Johnston's arrangement of the families of British fishes referred to the Hydroidae:

- O irises or bulbes naked, bud-like, protruding from the bases of the tentacula.
- Tubulifera, Ehrenberg (Tubulicola, Linnaeus; Tubulicola, Johnston; Les Tubulaires, Van Beneden).

Family 1. - Polyidae, or with only a radium polypidom.

Corynidae.

† Polyidae naked.


The tentacula with globose tips. Corynetica. The tentacula filiform. Cordophyra.

Family II. - Polyptera fistulosa; the tentacula whorled. Tensadica.

† The tentacula in a single whorl. Evistocordaria. + The tentacula in a double whorl.


** Irises in the form of a horned cups or vesicles scattered on the polyopidoms, and deciduous.

Sertoliadina, Ehrenberg (Sertoliadina, Linnaeus).

Family III. - Cells of the polyidoms. Sertoliadina.

† Cells biserif.


+ Cells uniserial.

The branchlets plumose or pectinate. Plumaria. The branchlets whorled. Antennularia.

Family IV. - Polyptera-cells on ringed stalks. Camp catalogueadica.


** Polyptera propagating by buds and ova, which develop themselves on and in the body of the parent.

Hydrina, Ehrenberg (Hydra, Linnaeus; Hydra, Johnston). One genus only. Hydra.

HYDROPELITIDAE, Watershields, a natural order of Exogenous Plants (Cochlospermum of Torrey, Gray, and Lindley). The species are aquatic plants, with floating peat-like fronds. Flowers solitary, yellow or purple. Sepals 3 or 4, coloured inside. Petals 3 or 4, alternate with the sepals. Stamens definite or indefinite, hypogynous, arising from an obscure torus. Anthers linear, turned inwards, continuous with the filaments. Carpels 2 or more, terminated by a short style. Ovules numerous, pendulous. Fruit indehiscent, tipped by the hardened style. Seeds definite, pendulous. Embryo minute, 2-lobed, enclosed in the fleshy sac of the amnion, at the apex of the nucleus, and external to an integument of fleshy albu men. There can be no doubt of the near relationship of these plants to the Water-Lilies. They are American water-plants, found from Guaymas to New Jersey, and also on the coast of Australia beyond the tropics.

Hydroptilus possesses is said to be nutritious, but slightly astringent. The leaves are employed as a remedy for phthisis and dysentery.

HYDROPONITE. [Mineralogy, § 1.]

HYDROTALCITE. [Mineralogy, § 1.]

HYMENOPHYLLEAE, a family of Ferns including the British genera Hymenophyllum and Trichomanes. The fronds consist of branched veins, each accompanied throughout by a membranous wing or margin; a cluster of capsules, set on one side of the leaf, which project beyond the edge of the leaf, the cluster being enclosed in a kind of cup-like involucre.

I. Trichomanes has the on an elongated filiform receptacle within a cup-shaped involucre of the same texture with the frond.

T. radiata, Babington, the Brittle-Fern (T. spectabilis, Wildenow), has fronds three or four times pinnatifid, glabrous; segments uniform, linear; involucres solitary, in the axis of the upper segments; some at first included, ultimately very prominent. The frond in fact consists of hard wiry branched rachis, each furnished throughout with a rather membranous wing. Rhizome black, downy, very long. Fronds arranged along the margin, divided, from 4 to 8 inches long. Involucres scarcely winged.

This is a very interesting fern, on account of its beauty, its rarity, its susceptibility to injury from exposure when in cultivation, and its entire absence from all European countries or islands, with the single exception of Ireland. In texture as well as in scent it resembles some of the marine Angio, and it has been observed to assume a life-like appearance on being immersed in water after being kept perfectly dry for years. It appears at this present time not to be found nowhere but in Ireland, though formerly it is said to have grown at Bell Bank, in Yorkshire. It has been lately supposed by some botanists that there are two Irish species of Trichomanes, the Killarney and the Glouin Carnagh plants. Mr. Newman believes it to be merely a variety of T. spectabilis, and calls it T. s. Andrewsii. It differs from the former in having lanceolate fronds and winged involucres. It is found in very damp shady places. No other fern will thrive well in a case with the Trichomanes, the treatment required for one being destructive to the other. The Trichomanes will live or even grow luxuriantly in a glass with other ferns, but will never attain a vigorous state of growth.

II. Hymenophyllum has the theca on a narrow subulate receptacle, within a 3-valved involucre of the same texture with the frond.

H. Tunicaeformes, the Tunicate Filmy Fern, has pinnae fronds; pinnis distichous; segments linear, undivided, or bifid, spinoso serrat; involucres compressed, spinoso serrat; rachis broadly winged. It is slender and delicate, the rhizome very long and thread-shaped. Pinnae, rachis, and involucres in the same plane. Valves of the involucres adpressed throughout the greater part of their length, slightly gibbose at the base. It is found amongst moss and in shady places, on the surface of rocks and stones, in many places in England, Wales, and Ireland. This plant is the Trichomanes Tunicaeformes of Linnaeus, very rare, and named after the resemblance of the stem to the Tunicaeformes of Linnaeus, the rhizome. It is found amongst moss and in shady places, on the surface of rocks and stones, in many places in England, Wales, and Ireland. This plant is the Trichomanes Tunicaeformes of Linnaeus, very rare, and named after the resemblance of the stem to the Tunicaeformes of Linnaeus, the rhizome.
values of the involucre 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 Heracleum maximum, and it appears to be a more 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 frequent to distinguish the one from the other.

(Newman, British Ferm.)

HYOSCIAMA. [CHEMISTRY, S. 1.]

HYPERURIC ACID. [CHEMISTRY, S. 2.]

HYPOXIDACE. Hyposid, a natural order of Endogonium. It is a tuberous 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. Flowers complete, hermaphrodite. Perianth pedicellate, adhering to the ovary; claws of the segments of the perianth; filaments distinct; anthers turned inwards, 3-celled, erect, opening lengthwise. The number of the petals of this order is very considerable. 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 orthophora are somewhat bitter and aromatic, and are employed medicinally in India. The tubers of C. stevens are eaten in the Marianne Islands; those of Hypoxis rostrata are employed by the aborigines of North America in healing ulcers and against intermittent.

I

IBALIA. [GALLOISH.]

IBAIL, IBRAILOW, or BRAILLOW, 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 near the large island, 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 1838 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 war 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 Kutschuck-Kainardji in 1774, the town was strongly fortified in the European manner; but the Russians took it again in 1829, and demolished its defences. It was restored to Turkey by the treaty of Adrianople.

ICARIAN SEA. [EGIAN SEA.]

ICTERIA. [MRULID.]

ICTINIA. [FALCONID.]

ID. [L.]

IDRIALINE. [CHEMISTRY, S. 2.]

IERAX. [FALCONID.]

IGNATIA, a genus of Plants belonging to the natural order of Capsaicaceae. The species of this genus, F. amara, yields the St. Ignatius’s Beane of India, under the name of Papeata, they are said to be a remedy for cholera. No proof has been afforded of their efficacy in this disease, and Dr. Lindley (Vegetable Kingdom) says that convulsions and giddiness are known to follow their exhibition when given in an over-dose.

ILICIN. [CHEMISTRY, S. 1.]

ILKESTON. [DERBYSHIRE.]

ILMINSER. [SOMERSETSHIRE.]

ILSEY, EAST (BERKSHIRE).

*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 Straits 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 Panjlah, Goojerat, and the island of Cutch. Sipsa is described separately [SIND, S. 1.], as are also the Tenasserim Provinces [Tenasserim], and the Eastern Straits Settlements [Malacca; Perak (979); Py. S.] (S.)

The administration of British India is now under the Governor General of 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 Governor 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-

mons, July 30, 1867, gives the following summary of the areas and population of the various states comprised under these governments:

**BRITISH STATES**

<table>
<thead>
<tr>
<th>Under the</th>
<th>Sq. Miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor-General of India</td>
<td>246,050</td>
<td>23,655,973</td>
</tr>
<tr>
<td>Lieutenant-Governor of Bengal</td>
<td>221,969</td>
<td>40,852,397</td>
</tr>
<tr>
<td>Lieutenant-Governor of N. W. Provinces</td>
<td>105,759</td>
<td>33,685,193</td>
</tr>
<tr>
<td>Governor of the Presidency of Madras</td>
<td>135,809</td>
<td>42,427,257</td>
</tr>
<tr>
<td>Governor of the Presidency of Bombay</td>
<td>131,544</td>
<td>11,790,943</td>
</tr>
<tr>
<td><strong>Total of British States</strong></td>
<td><strong>827,410</strong></td>
<td><strong>181,996,901</strong></td>
</tr>
</tbody>
</table>

**NATIVE STATES**

<table>
<thead>
<tr>
<th>Included</th>
<th>Sq. Miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Presidency of Bengal</td>
<td>518,833</td>
<td>38,702,294</td>
</tr>
<tr>
<td>In the Presidency of Madras</td>
<td>51,808</td>
<td>5,213,776</td>
</tr>
<tr>
<td>In the Presidency of Bombay</td>
<td>60,576</td>
<td>4,460,370</td>
</tr>
<tr>
<td><strong>Total of Native States</strong></td>
<td><strong>530,217</strong></td>
<td><strong>48,764,157</strong></td>
</tr>
</tbody>
</table>

**FOREIGN POSSESSIONS.**

| French Possessions | 1066 | 28,263,692 |
| Portuguese Possessions | 1056 | 11,326,103 |
| **Total of Foreign Possessions** | **1254** | **40,133,933** |
| **Total** | **1,466,676** | **180,882,234** |

The total revenue of British India for the year ended April 30, 1866, was 25,891,399l.; the total expenditure was 39,854,092l., showing an excess of expenditure over income of 972,791l. The total amount of the public debt bearing interest, April 30, 1866, was 48,014,941l., on which the annual amount of interest was 2,979,031l.,

The total value of the imports in 1864 from British India into the United Kingdom was 10,672,576l., and the total value of the exports thereto, being the produce and manufactures of the United Kingdom, was 2,127,636l., exclusive of exports of foreign and colonial produce valued at 423,732l.

Previous to the breaking out of the great mutiny, the army of the British government in India, including her Majesty’s troops and the Company’s European and native troops of all arms, consisted of 209,999 men; namely, Queen’s troops, Europeans, 9,460; Company’s troops, Europeans, 19,928; native troops, 269,591. The contingent troops of the native states, commanded by British officers, and available under treaties, by which it is agreed that they shall be under the superintendence of British officers, amounted to about 33,000 men.

The Indian navy consists of about twelve steam-vessels of war and transports, and about the same number of sailing vessels, armed with guns, besides a steam-boat for inland navigation.

The history of Hindostan, and the origin and progress of the East India Company are narrated under Hindustan and East India Company. Further historical details are given under Afghanistan, S. 1.; BOMBAY, S. 1.; and Travancore, S. 1., in which last article the narrative is brought down to the date of the treaty of Lahore, March 9, 1846.
March 14. Chuttar Sing, Shere Sing, and the principal chiefs of the Sikhs, together with 16,000 men of the Sikh army, surrender, with all their arms and 41 guns, to Major-General Gilbert, at Bawul Pundee.

March 29. Proclamation by the governor-general, announcing the annexation of the Punjab to the British possessions in India, and the disposal of the Raja of Lahore, retires to Poonah, on a pension of 40,000L a year.

May 6. Sir Charles Napier arrives at Calcutta as Commander-in-Chief.

September. Kohuraj having been condemned to death in August, for the murder of Agnew and Anderson, is sentenced to transportation for life.

850.

February 27. Sir Charles Napier, by a general order, disbands the 96th 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-Peishwa of the Marathas, at Bithoor. He enjoyed, by treaty, June 13, 1817, and June 1, 1818, a pension of eight lacs of rupees (80,000L) a year.

August 9. The last of the Bajee Rao's brother, was adopted 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.


1852.

January 4. The viceregy of Rangoon erects stockades and batteries, to prevent the British vessels from communicating with the shore or leaving the harbour. The British commodore destroys the batteries, and forces the passage of the river Irawaddy.

April 5. Maribah 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 Birmese army. A British force of 3,400 men sent from Rangoon defeats the besiegers, and relieves the garrison.

December 20. 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 20, 1853, "to provide for the government of India." The following is the substance of the most important clauses:—

August 20. 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 eighteen 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, as members (sec. 3) three of the six appointed by the Crown. 10. The person appointed by her Majesty to be Commander-in-Chief of her forces in India is also to be Commander-in-Chief of the Company's forces.

December 11. Declared the territory of Nagpoor, whose territories were then added to the British possessions in India.

1855.

March 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.),

February 29. Viscount Canning assumes office as Governor-General, in place of the Marquis of Dalhousie, who arrives in England, May 13. For a notice of the dispute between the British and Chinese authorities at Canton, see China, S. 2.

1857.

The year 1857 is sadly distinguished by the mutiny of the native regiments in Bengal. In January, February, March, and April, there were mutinies of single regiments at Barrackpore, Berhampore, 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 in committing murders and appalling atrocities, they marched to Delhi, where they were joined by other native regiments, and where similar acts of barbarity were perpetrated. There the mutineers fixed their head-quarters, and the Old King of Delhi was proclaimed Emperor of Hindustan. Other native regiments broke out into mutiny at various places, but were mostly disarmed and dispersed, till the native army of Bengal had ceased to exist, at least as the soldiers of the East India Company.


May 10. 11. Mutiny at Meerut, and march of the mutineers to Delhi.

May 11. Mutineers arrive at Delhi, and are joined there by three native regiments of infantry and a battalion of infantry. Lient. Willoughby blows up the magazine, containing large quantities of ammunition, and escapes.

May 12. King of Delhi proclaimed Emperor by the insurgents.

May 13 to May 31. Mutinies at various places.

May 27. General Anson, the Commander-in-Chief, with a body of British troops, arrives at Kurnool, on the road from U&oelig;dorp to Delhi, and dies there of cholera. He is succeeded in the command by Sir Henry Barnard.

May 31. Mutiny at Lucknow of three native regiments of infantry and one of cavalry. They are attacked by the British under Sir Henry Lawrence, and dispersed.

June 5. Mutiny at Allahabad. The Europeans secure themselves in the fort, where they are besieged.

June 6. Mutineers under Nana Sahib attack Sir Hugh Wheeler's small force in their entrenchments at Cawnpore, but are driven back.

June 8. Sir H. Barnard enters the cantonments before Delhi with about 4000 troops. He encourages himself on a ridge in front of the Cashmere gate of the city.

June 10. 19. Mutinies at various places.

June 26. 27. Hugh Wheeler having been wounded in making a sally on the 20th of June, dies on the 21st; the small force at Cawnpore surrendered by capitulation to Nana Sahib. On the 17th of June they embarked in boats, but were fired upon and fully all murdered.

July 2. Sir Henry Lawrence, wounded by a splinter from a shell which was thrown into the room where he was seated, at Lucknow, died on the 4th of July. He was succeeded by Colonel Legis in the command of the European force, which maintained itself in the Residency and fort.

July 5. Sir H. Barnard dies of cholera before Delhi, and is succeeded in the command by General Reid.

July 7. General Havelock marches from Allahabad towards Cawnpore, with 3000 Europeans, and 300 Sikhs.

July 12. General Nicolson, with the Bombay flying column route the mutineers at Sealcote on his road to join the force at Delhi.

July 16. General Havelock defeats the insurgents under Nana Sahib before Cawnpore.

July 17. Nana Sahib blows up the magazine, and retreats to Bithoor. General Havelock enters Cawnpore.

July 19. General Havelock attacks Nana Sahib at Bithoor, driving him, takes 30 guns, and sets fire to the place.

July 22. General Nicolson, obliged to rely upon the small force he had from illness, is succeeded in the command of the force before Delhi by General Wilson.

August 2. The Maha-Raja Gholab Singh dies at Cashmere.

August 10. General Nicholson arrives at the camp before Delhi in advance of his column, which arrives in a day or two.

August 16. General Havelock, operating with his small force against the insurgents between Cawnpore and Lucknow, gains his ninth victory.

September 14 to 20. General Wilson, having received reinforcements and a siege-gun, takes Delhi by assault, the fighting being maintained in the city from the 14th to the 20th. On the 18th the British forces had entire possession of the city of Delhi.

September 26. General Havelock, accompanied by General Ostram, with 3000 troops, arrives at Lucknow and relieves the Europeans besieged in the Residency, but is unable to form a siege battery.

October 27. Sir Colin Campbell, having been appointed Commander-in-Chief, leaves Calcutta on his route to Cawnpore.

November 2. Sir Colin Campbell arrives at Cawnpore.

November 13. Sir Colin Campbell, with about 13,000 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-derided feint, brings away the whole of the besieged garrison, with all the sick, the women, and children, without the loss of an individual. The rebels are placed in security in the forces of Alambagh, about three miles from Lucknow.


December 7, 8. The Gwalior corps, having secured the line under General Windham, and obtained possession of the town of Cawnpore, Sir Colin Campbell attacks the Gwalior mutineers, and defeated them.

December 10. The defeated Gwalior troops are pursued by General Grant, with cavalry and artillery, 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 defeated at different places. In the mean time Sir Colin Campbell at Fдетгагег 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 John and Grant and others, 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.

Lord Palmerston's late government announced the intention to bring a bill into parliament, for the purpose of transferring the government of British India entirely from the East India Company to the British government, and Lord Derby's late government introduced (March 26, 1858) a bill for the same purpose.

Having now brought down the historical details as far as they are known at the present time (March, 1858), we shall give an account of the chief products of British India, and also of the material 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, oil, opium, maize, rice, and other cereals; besides which there are tea, spices, guns, dyers, 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 marshy; and these are the most valuable lands upon the plain country, it forms part of a two years' course; and outside the village walls, hand-weavers have been seen from time immemorial, making the coarse cloth generally worn by the natives. The low consuming situation of India is immense. Economically 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 Cochr, in the Mysore, in the northwestern part of the Panjab and of the Panjab and five million acres are stated in the statistical returns, printed by authority, to be under cotton cultivation in the three
The quantity of raw cotton exported to Great Britain in 1854 was 1,048,308 cwt., valued at 1,641,741L; but if, by means of railroads, the great cotton field of Berar, situated within the dominions of the Nizam of Hyderabad, were 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 present demand of Great Britain, might at once be made available.

The foregoing conditions relating to the province and prospects of Berar are partly, in course of being fulfilled. When the great Indian Peninsula Railway shall be completed from Nagpur to Bombay, and from Nerbuddah to the Indus, will have an outlet to the port of Bombay on one side, and to Mirzapore 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 Belgaum. The cotton of Bundelcund, of the Delhi territory, or of Oude, may be seen to this day, uncultivated and unpressed, passing down the rivers Jamna, the Ganges, and the Indus, in weekly 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 cart, 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. From the comparatively small demand of the cotton commerce may be seen struggling among unmade 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 Mirzapore. The best existing remedy, and if one line should not be sufficient, they should be multiplied, until the shipments of cotton from Nagpur shall be as certain and as cheaply effected as they now are from the other parts of India, is the cultivation of the sugar, for the better production of this substance; but if it were planted thickly, so as to exclude the air and light, and with the object of obtaining a long and pliant fibre, there is no reason to believe that this might not be done with much success, as to form a substitute for hemp which is cultivated on a large scale in Russia, Poland, and Italy. The hemp of Kangra, a district of the Himalayas, north of the Panj, 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 practicableness of producing hemp 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 raised in England, including all charges, at from 26s. to 31s. per ton, and it is said that its value here would be 35s.

But there are other fibres considered as substitutes for hemp, which are received from India, and have become most important as articles of commerce. 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 Mysore, the southernmost district of the Panj, 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 has attained in Bengal. The manufacturers have attained 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 cwt., valued at £1,643,154.

The fibre of Jute, or Jow's mallow, has not been till lately an article of commerce, but for some years it has been much employed in our manufactures. In India it has been long employed for making both cordage and cloth. The material is obtained from two distinct plants, which are known by the names of Jute in India and China, and is styled Chinese Hemp. The fibre is called Jute. The quantity of hemp, sunn, jute, &c., exported from the three Presidencies, but much the largest part from Bengal, amounted in the year 1854 to 570,250 cwt., valued at 200,476L.
Flax, or the linseed plant, has been cultivated in India from the 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 linen, which is grown for its fibre, but along the margins of fields of other crops, where the soil and climate are equally suitable. It is therefore a crop which the value of the 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 be of very important consequence to the flax growers, irrespective of its fibre, as it is already for its seed. The quantity of linseed and flaxseed imported into India during the year 1854 was 196,570 quarters, valued at 601.992.

It has been already stated, that the winters of Hindostan, and of the greater part of the country bordering on 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 and April, all three of the tropics seem to approach to the revision of the seasons. Cultivation of nearly all the European species 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 reaped in April before the heat sets in. The wheat, however, may be thinned by the birds, and 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 and thickest groves which mark the courses of the 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 1,281,363 cwt., valued at 675,927.

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. Royle, Surgeon-Major, in his "Geographical and Agricultural Resources of India," says: "A committee was then assembled for the purpose of submitting to Government a plan for the accomplishment of this object." But so far back as the year 1847, Dr. Royle had drawn attention to this matter, and pressed 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 mild climate about Nainital, yet it flourishes in the northern latitude of Peck, and in Japan, as well as about Canton, and these places are comprised within the parallels of 20° and 40° north latitude." Dr. Royle says that he believed that that part of the Himalayas, or at moderate elevations, there was a considerable prospect of success in the cultivation of the tea plant; for the different elevations allow of every variety of climate; the soil is well adapted to the growth of the plant; the climate 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 longitude, but not making more than 10° of northing in its whole extent. Though varieties of longitude no doubt produce difference in climate, yet as this is chiefly influenced by latitude and elevation, it is evident that along the whole extent of this mountainous country, there must be many localities which differ little in latitude and in elevation, and which must consequently resemble each other somewhat, and therefore probably also in vegetation." In the hills of Assam, the tea plant was found to be indigenous. Plants also were procured from China, as well as seeds and cultivators, to carry on the experiments of which it was resolved to make, and when the practicability of producing tea fit for 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, having brought forward the cultivation of tea as a successful issue, have handed over its further extension to a private company, who are carrying it forward with great advantage.

The directorate of this Company, employed in the cultivation and preparation of tea in Assam, for the half-year ending the 31st March 1856, amounted to 19,655.

In the Kungdras district, quite at the other extremity of the British territory, still on the lower slopes of the Himalayas, in the Marree Hills, and in Ghurwal, Kumaon, and the Darya Doon, and Darjeeling, similar successful experiments in tea culture have been made, and annual production of excellent tea takes place. Its cultivation by the natives has been encouraged by grants of land on good terms, and so much care bestowed on the production of a saleable tea, that hope, that 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 Assam and northern India, and which has been occupied by other Indian 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 Nepay. The Assam Company was formed in 1798, and in the United Kingdom in 1854 was 286,381 lbs., valued at 32,943.

Only a brief allusion will be made to Opium, for although it is a native of the tropics, its cultivation, in the United Kingdom, is not a free product of its soil. It cannot be cultivated except by.permission of the Government, who retain the monopoly of it in their own hands, and discourage, by heavy duties, any extension of its production. In the case of a植物, the utmost care is expended, and the best care with which it is maintained by these restrictions, is probably a benefit to that portion of the human family which is addicted to its use. The profit realised by the Government by its sale, exceeds three millions sterling. There is one fact in connection with this subject, which is worth recalling. Out of every pound of opium from which it is prepared, does not appear to be indigenous to India. It has been found nowhere in a wild state, but it is a plant which is extensively distributed over both the European and native provinces of India. The plants cultivated in the Bengal Presidency, chiefly in Malwa, and in Central India, is due to the natives alone, unaided by science or European superintendence. The selection of soil and climate under which it has been found most to thrive, with the circumstances of the soil, that is, the dryness necessary to its cultivation. Nature does the rest, ordinary care only being necessary, to collect the milk and secretions, which are extracted from the capsules of the plant, and to evaporate the moisture with which it is mixed, till the residue is sufficiently dry and prepared for use.

With the exception of tin and salt, there scarcely is said to be any export of mineral substances from India. In 1856, the value of the tin imported into the United Kingdom was 52,130.

Several manufactured metals are specified in the tables of imports from the three Presidencies; but the probability is, that these are chiefly re-exports of British goods from the ports at which they were first landed to other places in the Company's dominions. Iron, manufactured, or iron, manufactured, or iron, lead, or any other metal except tin, is yet known among the exported goods from India. Very extensive deposits, however, of both coal and iron are known to exist; and when these two substances can be found in the same country within any reasonable distance of one another, to what extraordinary results may they not eventually lead! In Bardwan, a district of Bengal, an inexhaustible field of coal is known to exist, one of the seams of which has a thickness of thirty feet, and the coal-field has been worked for several years. The inland steam navigation of the Ganges has long been supplied, and much of the coal used by sea-going steamers has come from Bardwan; but its price in Calcutta has not always, having reference to quality also, been equal to the coal from the Assam fields. Coal is also found in the valley of the Nerudder, and in the Tenasserim Provinces; but from neither of these localities has it yet been profitably procured. Vast masses of the iron-ore have been found in the west provinces by the Government of India, and there is an annual export of manufactured iron from that place. The Gwalior iron is well known in the inland trade, so that it of Kangra and Kumaon, which is exported to the iron-ore of the adjacent hills, and there is an annual export of manufactured iron from that place. The Gwalior iron is well known in the inland trade, so that it of Kangra and Kumaon, which is exported to the iron-ore of the adjacent hills, and there is an annual export of manufactured iron from that place.

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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 them 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 common in Europe. No smelting of copper ores is done in India. The manufacture of brass is imported annually at the principal ports of the three Presidencies, to a large amount. The natives of Hindostan have neither possessed the capital nor the skill to mine deeply, and to abstract the riches which he buried in his bed of ore and cover with sand and clay the nation produce of their shallow workings are a mere indication.

The southern portion of the Tenasserim Provinces, from the province and latitude of Tavoy, to the Pakhan river, abounds with deposits of tin, which is found in great proportions in the beds of streams and in hills of disintegrated granite on the plain. It is a pure peroxide of tin, requiring the application only of a moderate heat to produce the perfect metal. The quantity hitherto prepared in the British territory, can be regarded 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 from the north in the Myanma, and the soil is now beginning to be seen dotted here and there in the forests. They have a smelting establishment at the mouth of the Pakhan river, and the tin is carried away in junka to Penang and Singapore.

Salt 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 important independent products 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 accede to the wants and necessities of the community. 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 of irrigation were formed either from the head waters of some of the rivers as they issue from the Himalayan range, or lower down, where, at one period of the year, they overflow the adjacent plains. In some of the minor hills the head waters were dammed up, and the water formed, from which 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 requires to insure his prosperity.

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 Punjab, and in the Presidency of Madras.

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 Sutlej to Allahabad, is irrigated on a large scale and 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 lineal extent. The volume of water available for irrigation from this river, has been calculated at 2,870 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 named, the Nerbudda. On this basis of calculation, the irrigation, one cubic foot of water per second will suffice for 564 acres of land, equal to about one square mile, so that the canals of the Jumna are supposed to serve for the irrigation of 172 square miles.

The Ganges Canal 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 256 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 unequalled in its class and character among the irrigation works of the world. When the canal 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, and on that account alone the great empirical value of the Ganges Canal is proved. 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 world. The canal, in all its branches, and the greatest triumphs of the engineering art of which any country can boast. Its total estimated cost is 1,655,545l., of which 1,400,000l. had been expended up to the beginning of the year 1837. In the Punjab 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 420 miles, and the cost 500,000l. 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. The Punjab Canal will be of great advantage to the country. But towards the southern part of the Punjab, at and below Mooltan, and on each bank of the Indus, another description of irrigation canal prevails, which is formed by an accumulation of water formed by those rivers, and leading off bodies of water in channels to considerable distances inland. These canals have existed for long periods, and efforts are now being made to restore and bring them again into extensive use.

In the Madras Presidency another system of canals prevails, which is suited to the features of the country. The tract to be irrigated being narrow, in comparison with the extensive plains of the North-Western Provinces, and the body of available water considerably less, it has been found expedient to make the canals of great length across the channels of 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 290,000l., on the Cauvery 460,000l., and on the Krishna 150,000l.; and, without doubt, 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 order of 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 to be connected with the whole of the principal and most productive provinces in the Indian Empire will be linked together. Already the natives of every class and caste, contrary to general expectation, unborn of any prejudices, banding together in the same railway carriage, have seized with avidity the advantages of the locomotive train in Bengal, Madras, 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 witness the new wonder.

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 rivers of the Punjab to Lahore, and perhaps to Peshawur. From Bombay another main line has been commenced, and will stretch nearly across the continent of India at its broadest part, taking the general direction of the Nerbudda, passing down the rivers Konda, Kandiahi, Sauger, and Bundelcund, branching into the great cotton-field of Central India to Nagpoor, and affording an easy outlet for that valuable product, either to be shipped at Bombay, or be transported down the river Nerbudda to Mirapaor to Calcutta. At Mirapaor a junction will be formed with the Bengal line. There is also a line to the northward of Bombay, in order to bring down the cotton from Baroogh, Baroda, and Surat. In Sinde there is a short line undertaken to connect the port of Kurachhee with the
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 Bellgaum;
the other to strike across to the western coast, having its
other terminus at Madras.

At the beginning of 1857 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:

<table>
<thead>
<tr>
<th>Main Line</th>
<th>Miles in</th>
<th>Miles in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opened</td>
<td>Progress</td>
<td></td>
</tr>
<tr>
<td>From Calcutta to Delhi</td>
<td>1,166</td>
<td></td>
</tr>
<tr>
<td>Bombay to Mirapore</td>
<td>49</td>
<td>750</td>
</tr>
<tr>
<td>Bombay to Madras</td>
<td>71</td>
<td>300</td>
</tr>
<tr>
<td>Madras to Bellary</td>
<td>89</td>
<td>296</td>
</tr>
<tr>
<td>Madras to West Coast</td>
<td>90</td>
<td>300</td>
</tr>
<tr>
<td>Total</td>
<td>339</td>
<td>2,296</td>
</tr>
</tbody>
</table>

When these grand trunk lines of railway shall have been
completed, a glance at the map will show that, although the
richest districts will have been penetrated, and the principal
cities connected, the 2,896 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 an internal communication; for, 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 that extent which even the private trade 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,
southernly as well as northernly, a regiment of musketeers,
of relief from one station to another, had to be preceded by
a native guide. This is now altered. Roads, even if
unbridged and unmetalled, exist in almost every district; and
there are three great lines of communication of considerable
length; the earliest begun only in 1836, from Calcutta, and
recently prolonged to Peshawur; this, however, is not yet
completed in parts.

The three grand trunk roads constructed and maintained,
are as follows:

<table>
<thead>
<tr>
<th>Length in Miles</th>
<th>Cost £</th>
<th>Annual Rates 6d. per Mile for Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Calcutta to Peshawur when completed</td>
<td>1,426</td>
<td>1,426,000</td>
</tr>
<tr>
<td>From Calcutta to Bombay, as estimated</td>
<td>1,002</td>
<td>500,000</td>
</tr>
<tr>
<td>From Bombay to Agra</td>
<td>734</td>
<td>243,675</td>
</tr>
<tr>
<td>Total</td>
<td>3,162</td>
<td>2,169,676</td>
</tr>
</tbody>
</table>

The above average expenditure upon public works of all
kinds in India during fifteen years, between 1827 and 1842,
was 299,732L. In this are comprised roads, bridges, embank-
ments, canals, tanks, and all works of irrigation; but since
1828 the outlay has been much greater, including the sums
spent upon the Ganges and Panjib Canals, and the guaran-
teed interest upon Railway Stock, which must be regarded as
a contribution to public works.

The electric telegraph, which has been recently established
without any expense, and so auspicious in its progress, can scarcely be regarded
as bearing so directly 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 govern-
ment and to the preservation of peace, the rapid transmission
of intelligence from one part of the country to the other, and
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'Shaughnessy,
availing himself of the executive officers of Government
throughout the country, to set up the posts and to build
pillsars for the support of the wires, and since he has own
trained and furnished the line, and previously prepared and brought
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
Bombay, including the Advertisement on the Indus, from Agra to Bombay, and
hence to Madras, extending over 3000 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
4000 miles does not exceed 600L. per mile, although the
physical character of country intervened sometimes to
make it indispensable.

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. The Indian Territory is
bounded by the 32° 30' and 39° N. lat., 94° and 106° 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 'Report of the Census'
of 1850, 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 Kansas. The Indian Territory now contains, at
from 100,000 to 120,000, four-fifths of whom have been transplanted
from countries east of the Mississippi.

In the south-eastern part of the Territory there is a range
of hills of moderate elevation; the remainder is a plain, or
magnificent grassland, undisturbed by any body of
water. But a great portion of the country is prairie ground, and 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 it, and furnishing in their waters
great wealth of fish. The Arkansas flows through the midst in a
south-eastern direction, and receives in its passage numerous
tributaries, some of considerable size. The chief of these
tributaries is the Canadian River, which also has numerous
tributaries. The Red River originates in Texas and, like the
Kanas, the northern portion of the state; both of these,
as well as the Arkansas, are navigable within the territory
in certain seasons by steam-boats. The country possesses
capabilities for the prosperous maintenance of a large popu-
lace; the middle and far up the rivers, as well as the
larger part of the country, appears to belong to the Lower Carboniferous series
of rocks. On the east are the Upper Carboniferous strata,
or coal-measures, a part of the great coal-basin of Missouri and
Illinois, broken towards the north and northern extremity of
the Cretaceous group of rocks. On the south is a narrow
belt of Lower Silurian rocks, consisting along the Red River
of blue limestone, with eruptive rocks. Coal is not the only
mineral obtained. Both lead and iron are found; and there
are several springs, from which a large number of wells
may be manufactured. The climate is generally healthy. The
northern portions are subject to keen winterly 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 cultivable 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. Maize, wheat, 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 appro-
priated for the permanent residence of the Indian tribes
transported from the settled parts of the United States. It
need hardly be said that they have not turned to full account
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 sought amongst them,
and with the assistance of the Commission of Indian Affairs, some of the larger tribes have established
regular governments, legislatures, judicial officers, churches,
schools, newspapers, &c.; have introduced the manufacture
of cloth, and engaged in agriculture, cotton and
many farm and domestic use; cultivate the land with a con-
siderable amount of skill; rear horses and cattle; build
houses; and export to neighbouring states maize, cotton,
hides, &c. By the treaty of removal and settlement, the
federal government furnishes them with blacksmiths,
wrights, and some other mechanics, and at their first settle
1. The Capitolium. The undeveloped axis is here usually enlarged upward, with a fleshly or spongy form, and the more so if the number of flowers is very great. It may be more minutely designated as simple, discoid, cupuliform, lageniform, conical, and cylindrical, as it approaches nearer to one or another form, passing gradually into the spadix. Special varieties are:

**a. The Calathium (Anthodium, Ehrh.; Flos Compositus, 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.**

**b. The Cenannithium, Nees (Hypanthodium, Link.).** Exactly like the preceding in some Oricocaceae. A cup-shaped placenta in Ficus is no distinction, since it is wanting in Drostania; and it exists in some Compositae; the same may be said with regard to the sterile bracts, which are as much stunted in Drostania as they are clearly present in Ficus.

2. The Spikes (Spica) in very various forms. The kinds are:

**a. The Catkin (Amentum), distinguished by the fact that it falls off entire, or by its imperfect flowers.** The male inflorescence of Cupulifera, Salicocoe, Batoulacoe, and some few other plants also is a spadex.

**b. The Spadix, a closely crowded spike, or partially a cylindrical capitulum with fleshly, peduncle; in Araceae, Maiace, and some other Grasses, and in Palmea, in the last of which it is often composed (Spadix Ramous).**

**c. The Cone (Strobilus or Conus), a cylindrical capitulum or solid spike, on which the individual foliar organs become woody scales; as in the Comifera, the Casuarinaceae, the Balatulaceae, and some others.**

**d. The Spikiel (Spicula), the simple inflorescence of the Grasses and Cyperaceae; namely, a few-flowered spike, whose flowers have no bracts, surrounded at the base by one or two sterile bracts (Glume).**

3. The Umbel (Umbella) in the Umbelliferae; when compound of orders of Umbellula (Umbellula). The Raceme (Racemus) occurs in very different forms; it is usual to distinguish in it—

**a. The Corymb (Corymbus), a pyramidal raceme.**

4. The Cyme or False Umbel (Cyme), is a corymb with Inflorescentia Centifraga. That only singular cases are distinguished in this is a proof of the totally unscientific patching together of our terminology. The compound raceme, the compound umbel, and capitulum, with inflorescentia centifraga are all called a Cyme (Cyme), which is contrary to the commonest scientific usage. De Candolle has reviewed and further amplified the term Cyme to the inflorescence of the Boraginaceae, which, on account of the peculiar manner in which it unrolls itself, he terms Cyme Scrophiodes; and he adds the fiction, that the underneath 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 Cycadaceae. The position of the bracts, as seen in 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 buds.

C. Once-Compound Inflorescence.

5. The Cyme or False Umbel (Cyme), is a corymb with Inflorescentia Centifraga. That only singular cases are distinguished in this is a proof of the totally unscientific patching together of our terminology. The compound raceme, the compound umbel, and capitulum, with inflorescentia centifraga are all called a Cyme (Cyme), which is contrary to the commonest scientific usage. De Candolle has reviewed and further amplified the term Cyme to the inflorescence of the Boraginaceae, which, on account of the peculiar manner in which it unrolls itself, he terms Cyme Scrophiodes; and he adds the fiction, that the underneath 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 Cycadaceae. The position of the bracts, as seen in 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 buds.

6. The Spikes of the Grasses (Spica), several spikes united in a spicate arrangement, as in the Grasses; the component spikes are termed Spikela (Spicae).

7. The Umbel (Umbella). Umbels united in umbels; the components are termed Umbellulae (Umbellulae).

Sound terminology would have long ago rejected these words, and exchanged them for Spica and Umbella Composita.

8. The Panicle (Panicula); see No. 11.

None of these remaining combinations deserve special names, and may probably be classed among those mentioned under 9 and 11.

**a. Inflorescentia Centifraga.**

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**INDIN. [CHEMISTRY, S. 1.]**

**INDIC ACID. [CHEMISTRY, S. 1.]**

**INFLORESCENCE. [INFLORESCENCE.]** The following is a list of inflorescences and their names, from Professor Schleiden's 'Principles of Scientific Botany.'

A. The Solitary Flower, as terminal or axillary-flower (Flos Solitarius, terminalis vel axillaris). The latter may be situated in whorls, and then form a Verticil (Verticillus).

B. Simple Inflorescence.

**a. Inflorescentia Centifraga.**
9. The Cyme or False Umbel (Cyma): see No. 5 and No. 14.
10. The Anthela: see No. 16.
** Mixed or Heteromorphous. **
* Inflorescence Centrifuga. *

See No. 14. ** Inflorescenta Centripeta. **

See No. 11. ** D. Many-Times-Compound Inflorescence. **
* Inflorescencia Centripeta. *

11. The Panicle (Panicula), every many-branched inflorescence in Grasses universally, and otherwise wholly in developed pedicels.
12. The Thyrsus (Thyrusa), a panicle, 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 Inflorescence Centrifuga and Centripeta are mingled; others differently; all arbitrarily.
13. The Anthus, an inflorescence that has the kind of aspect of that of the Amaranthus caudatus or the Cheno-
dioica. **
* Inflorescencia Centrifuga. *

14. The Cyme (Cyma), also in manifold combinations, in which we do not consider whether the side ramifications follow the Inflorescence Centripeta or Centrifuga in longer pedicels.
15. The Fascicle (Fasciculus), a manifold compound cyme, with short pedicels, and rather crowded.
16. The Anthela, all kinds of inflorescences in the Juncaceae and Cyperaceae.
17. The Glomerule (Glomerum), many inflorescences that appear almost like a capitulum, and consist only of ill-formed, imperfect flowers, as in some Cheno-dioicaceae, Urticaceae, and Juncaceae.

We subjoin Professor Schiedel's closing remarks:—

"I have many of such with my faculties to draw for myself 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. Rather 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 minutely the progressive development through a large series of plants. For the sake of those unacquainted with these matters I will insert the following examples:—In Lotus corniculatus, Koch ('Syn. Fl. Germ.') has a Capitulum, Kuntz ('Fl. Berol.'). For Chloris purpurea, Koch ('Fl. Excurs.') actually a Fasciculus. To Eriophorum vaginatum Kuntz gives a Spica; Koch a Spicula. For Cadinum Marius Kuntz has Umbella Axillariae at Terminalia; Koch, Anthema Axillarea et Terminaliae; Reichenbach, Cyma Axillarea et Terminalia; in Iodeia sanguinea Koch has Spiculae in Fasciculum aggregatia; Kuntz, Spiculae Conglomeratae. I have here omitted the French and English botanists, or the matter would have been still more glaring."

Huxley. At the time the classification given under the head Polyostraca 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 Dendritica, which are now generally recognised as plants. [Dendroica, S. 2.]
The group of Pseudopoda'ta tortuosa must also be placed amongst doubtful creations, although many physiologists do not hesitate to group them amongst plants [Diatomaeces, S. 2], whilst the groups Monandria and Polyonema 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 joined in the American Journal of Science, for 1842, thus writes to Mr. Dana:—"You may remember a paper I read at the meeting at Cambridge, United States, in August 1849, in which I showed that the embryo which is hatched from the egg of a Planaria is a genuine polygastric animal—
ment and evolution of a Tricodium, a discovery which
Ehrenberg has attempted to explain by the supposition that the
live forms of the Actino-phyceae, in the formation of the
pristine condition. The enucleated solid is gradually dissolved, and
a scan of the change of appearance from time to
time, if entirely soluble, so for instance an Infusoriun, the
space in which it is contained contracts as the dissolution of
the material contents proceeds. Should there be however an
indissoluble residue (a membrane composed of cellulose, a portion of chitine, a shell of a
Lymnaea, or case of a rotifer, &c.), a passage for its exit is
formed, and it is expelled by renewed contractions of the
homogeneous mass, which is then thrown out in the form of
a small ball, so as that which the mould followed in its introduction.
The passage and the opening through which the expulsion
was effected disappear again without leaving any trace."

In the Actinosperms, the whole body is thrown into the
shape of the creature which inhabits the shell of the large family
known as Foraminifera, and Dujardin suggests that the
encircled forms of Dictyophor and Acrora are transitions to the
more decided forms of Foraminifera. Hence he proposes the
formation of several forms of the Ehrenberg's Infusoria,
with the Foraminifera or Polyhalmia, under the term
Ethereopoda. Little therefore is left to say of what may be
regarded as true Polygastria. They all appear to have a
distinct mesaxonic arrangement of the body, and this is
usually surrounded by vibratile cilia, as is seen in
Monas atomus and Lewesopus patula. These cilia
apparently bring the food to the mouth of the animal.
An anal orifice is described by Ehrenberg in the majority of
these animals, which is usually ciliated: onwards, and
carmin or indigo (a writer in the 'Microscopical Journal'
recommends the red pigment which lines the cornea of the
common house-fly) is introduced into the water in which
they are contained, the transitory body of the infusorium
is speedily seen to be studded with coloured globules
consisting of an aggregation of the particles of colourless-matter.
Ehrenberg regarded these globules as distinct sacs, which he
supposed were given off from a central intestinal canal, as
seen in Lewesopus patula. A single line passed from many
stomachs, he gave them the name of Polygastria
(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 animal is often covered
with vibratile cilia, and it is to the constant action of these
organs that the varied movements of these animal-sac are
due. The movements thus effected are perfectly automatic,
and in no way connected with any intelligent conscious-
ness. All the movements of the animal are due to cilia, as the whole of the tissue of the animal is observed to
contract in Amaba, Amphileptus, and the stalk of the
Verticella.

Although Ehrenberg has described a complicated apparatus
for reproduction, no instances of conjugation are recorded
amongst the true Polygastria. 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 Paramecium could
produce 268,000,000 of cells in a single month. From anal-
ogy 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 this case it will be seen, that it is not improbable that one of the
modes by which these beings are enabled to spring suddenly
into existence, is the production of winter-eggs, or reproduc-
tive bodies of a kind that will resist the influence of an absence of
moisture from the spot in which they ordinarily abound.

The true Polygastria seem universally diffused. Wherever
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
are found in abundance in the body cavities of the
animals, and not unfrequently in the blood of the
man. Wherever the organic elements, carbon, hydrogen,
nitrogen, and oxygen, are capable of uniting to form water,
carbonic acid, and ammonia, there they may be expected to
be found. In general, the nearness of the
abundance of the
form to the animal, seems to determine the forms they assume. One set of
forms inhabits salt water, another fresh. Every miner
spring has its peculiar inhabitant. The sulphureous springs of the Pyrenees, the chalybeate waters of the Rhine, the siliceous, calcareous, and alumminous waters of Europe, all contain them. They are found with the red snow of the Alps and the poles, and with the Conferens thermales of the hot springs of Baden. They are almost everywhere accompanied by plants. Perhaps it would be wrong to call any beings animals that are not found feeding on plants, as it seems to be a law of organic existence that plants should support on mineral matters, and animals on organised matters. When asked of these beings, Professor Owen gives the following reply: "Consider their incredible numbers, their universal distribution, their insatiable voracity, and that it is the particles of decaying vegetable bodies which they devour 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 inorganic world, these wakeful members of nature's invisible 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 into living tissue in their own bodies, they become the food of large Infusoria, as the Rotifer, 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 brought by a new route from the extremity of the realm of organic matter.

"There is no elementary and self-substantive organic matter, as Buffon taught; the inorganic elements into which the particles of organic matter pass by their final decomposition, are organically recomposed and fitted for the sustenance of animals through the operations of the vegetable kingdom. No animal can subsist on inorganic matter. The vegetable kingdom thus stands, as it were, between animal matter and its ultimate destruction; but in this great office, plants must derive most important assistance from the Poly-gastric Infusoria. These invisible animalcules 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 minutest division, 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 1772, 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, which secured for him a high rank in some of the learned 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 1811, and which was finally completed, in 6 vol. 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 work was 'Lettere Lettere,' 4to, 1780, 1802-30; 'Galleria Omerica,' 3 vol. 4to, 1850-31, a work intended to illustrate the 'Idilii' and 'Odysseia' by the monuments of antiquity; 'Pitture di Vasi Fittili esibite dal Cav. F. Inghirami,' 4 vol. 4to, 1850-37, in which was his avowed object to illustrate the mythology and the history of the ancients; and 'Storia della Toscana, in Sette Epoca distribuita,' 16 vol. 8vo, 1841-43, the last two volumes being devoted to the bibliography and index. He also wrote several papers and a number of papers in the archives, and in the 'Archivo Storico Italiano,' &c. Cavalire Inghirami was for several years keeper of the Laurentine Library at Florence. He died on the 17th of May 1856.

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 1824 he entered parliament as member for Dundalk, a borough at that time in the possession of the Earl of Charleville. In 1826 he was elected for Ripon, the representation of which borough he resigned in the spring of 1829, in order to contest the University of Oxford against the late Sir Robert Peal, who had been re-elected. He was appointed Commissary-House in introducing the Roman Catholic Relief Bill. From that time he continued to represent the University until January 1855, when he retired from parliamentary life, and was sworn a member of the Privy Council. His public life was spent, for the most part, in appointments to which his appointment to the post of Lord Chief Justice he inherited the ancient opinions of Lords Sidmouth and Liverpool; he steadily opposed the Repeal of the Test and Corporation Acts, the Roman Catholic Relief and Reform Bills, and the admission of Jews into parliament, and every measure which he religiously thought would lead to unchristianise the legislature. On these points his opposition was strong and consistent, though to a certain extent characterised by partisanship and prejudice. He took an active part in the management of the religious societies of the Established Church, and also of the learned societies of the metropolis. In private life he was highly respected as an amiable and accomplished gentleman. He died in Bedford Square, London, May 5, 1855. He died intestate, and without an offence either at Common Law or by Statute, (4 & 5 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 Special Injunctions. An injunction is now a new route from the extremity of the realm of organic matter.

INJUNCTION, at Law. The Common Law Procedure Act, 1834, among other improvements, has enabled the Superior Courts of Common Law to grant writs of injunction after action brought, in order to restrain the repetition or continuance of the wrongful act complained of, thereby in this way avoiding the necessity of a resort 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 perpetration of a wrong. See INJUNCTION, at Equity, and INJUNCTION, at Chancery.

INJUSTICE. [Chemistry, s. 3] INJUSTICE. (See INJUSTICE, s. 3.) 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 referred for that purpose transmitted. The County Court Judge exercises the same authority as the Court in London, by desiring to know the reasons of the Insolvency. (10 & 11 Vict. c. 164.) See also PROCTIONS, Act, s. 3.

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 of 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 Kolliker in his 'Manual of Human Physiology.' The muscular coat of the smaller intestines is somewhat thicker in the duodenum and the upper portions, than is the lower; it has in general a thickness of 2—4, and is composed of two coats, the internal and the external. The former are less developed, and do not form a continuous layer, 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 serous membrane, so as at once to leave the second layer exposed. The latter is complete and continuous, consisting of a thin layer of tissue which helps to connect the coats and is never不含一个有共同的核膜——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 or two small arteries of 0.01—0.015. The blood is usually carried back directly into the larger trunks of the submucous tissue by a vein of 0.022, which does not arise as in animals, by the arching round of the arterioles, but possibly from the gradual coalescence of the finest capillaries. The relation of the nuclei to the matrix, 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 cecal branches, the number of muscular fibres, makes it very likely that they originate in a filiform manner. On this subject Professor Kölliker remarks that in the human subject he has never succeeded in meeting with villi distended with chyle, and in empty ones, he has been unable to obtain any decisive evidence; on the other hand, in animals, he feels certain that in many cases only a single lactule, which has a conical and frequently enlarged end, and whose diameter is much greater than that of the capillaries, traverses the axis of the villus. He says that he believes that all the narrow 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 lactules may possibly be different in the broad and foliaceous forms.

In addition, the organs the villi also contain, as Brücke discovered a short time ago, a thin layer of longitudinal smooth muscles, situated more centrally round the lactules; these however are not always distinct in man, they produce contractions of the villi, which are very evident immediately after death, and are frequently capable of being produced in the dead subject, and can only be observed in perfectly fresh portions of intestine. It consists everywhere of a simple layer of cylindrical cells slightly narrowed below of 0.01 — 0.012 in length and 0.04 in breadth, whose contents are usually lying but fine 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 it is difficult to separate them, but on the contrary, are distinctly visible from without, and, under a magnifying glass, can be distinguished from those of the adjacent villi, so that they can be distinguished from those of the adjacent villi, so that they can be distinguished from those of the adjacent villi, so that they are at first either not at all or only indistinctly distinguishable, though on the surface they have the appearance of a beautiful mosaic. The cylindrical only become quite distinct when they are either spontaneously or artificially detached, and then show the passage in a longitudinal manner that they hang together in continuous portions, all the cells covering a villus sometimes coming off together like the calypters 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 long action, however, or by that of the intestinal fluids, 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 small occurrence of fat-globules 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 appears first as a fine emulsion of the intestinal fluids, the cells in different regions of the villi, so that in each we soon observe a large ovoid shining droplet. The number of these fat-cells rapidly increases, and then the villi acquire a very peculiar appearance, often as if beset with pearls, and with parts of the villi so thickly studded with fat, and consequently bright and shining, with those which are empty and pale. In the end all the cells become filled with these droplets, and the epithelium appears quite dark by transmitted, but whitish by reflected light, giving its aspect to the whole villus.
With the repletion of the entire epithelial covering of the villae, absorption commences, but up to this time nothing has entered the lacteals. This however soon takes place, and the first indication we observe is the breaking up of the large drops of fat in the cells into many tolerably minute fatty molecules. When this has occurred, these drops penetrate the substance of the villus itself, fill it more and more, and at last enter the central lacteal, whose whole length they eventually occupy. In the mean while, fresh fat has been continually passing in from the intestinal canal, not in the form of large drops, but in the form of small ones, ever, but henceforward in small molecules or drops of the same kind as those which were at first developed secondarily in the cells. On the other hand, at a subsequent period, we not uncommonly meet in the interior of the villus with large rounded or oval masses of the nutritive element, especially in the immediate vicinity of the lacteals. In man the process is probably the same as in animals. These observations demonstrate that fatty matters are absorbed as such, and are not saponified; on the other hand, it cannot at present be certainly stated how it is that they penetrate the membrane of the epithelial cells, the permeability of the villus, and the walls of the lacteals.

The whole process may be compared to the imbition of a porous substance by the capillary vessels, much as by fat and fatty molecules of the chyme are probably absorbed simply in consequence of their being carried along with its fluid part. While digestion is going on, we frequently find the whole parenchyma of the villus densely filled with small nuclei, here and there surrounded by cells, which are never entirely absent in a villus, but are at other times far fewer, and particularly are not to be distinguished in its interior. Of the whole villi, small intestines contain two kinds of true glands: 1. tubular glands, which are disposed over the whole mucous membrane; 2. racemose glands, in the submucous tissue of the duodenum.

The Racemose Glands, or as they are commonly named, according to Brunner, are, at the commencement of the duodenum, upon the outer side of the mucous membrane, a continuous layer, which is best developed and thickest close to the pylorus, where it constitutes a considerable glandular mass, and extends about as far as the aperture of the biliary ducts. If the two layers of the muscular tissue be dissected off a stretched or distended duodenum, the glands may readily be recognised as yellowish flattened bodies of $\frac{1}{4} - \frac{1}{2}$ on the average $\frac{1}{4} - \frac{1}{2}$ with their angles rounded off, which incline within a little connective tissue, close to the mucous membrane, and send short excretory ducts into it. In their minute structure Brunner's glands, the terminal vesicles of which measure 0.080-0.090, even 0.089, agree perfectly with the racemose glands of the stomach in their component parts. The alkaline mucus, in which so formed elements are contained, having no digestive action upon coagulated protein compounds, and probably merely subservient to mechanical ends.

The Tubular, or Lieberkühnian Glands (cryptae mucosae), are distributed over the whole small intestines including the duodenum as innumerable straight narrow coeca, which occupy the entire thickness of the mucous membrane, and are frequently slightly enlarged by their extremities, though hardly ever dichotomously divided. The best idea of their number is obtained by viewing the mucous membrane either from above or in vertical section, under a low power. In the small intestines the coeca stand close together, almost like palisades; in the form of which we observe that the glands do not occupy the whole surface, but only the inter-space between the villi; here however they exist in such numbers as to leave no intervals of any width, the mucous surface between the villi appearing merely like a sheet.

Even on Peyer's patches, and over the solitary follicles, these glands are to be met with, but in man they lose those portions of the mucous membrane which lie immediately over the cores of these patches, and therefore are arranged like wings along the follicles.

The length of the Lieberkühnian glands equals the thickness of the mucous membrane and varies from $\frac{1}{4} - \frac{1}{2}$; their breadth is $0.095 - 0.096$, that of their aperture, $0.09 - 0.093$. The mucous membranes of the intestine contain two homologous membrana propria, and of a cylindrical 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 rapidly changed after death, or on the addition of salt, 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 aggregatae). They are rounded flattened organs, freely distributed in the submucous tissue of the duodenum, and may be found from the duodenum to the ileum, but they are not uncommonly to be met with in the lower part of the jejunal region, and even in the appendices epiploicae, and occasionally in the duodenum, and even in the inferior 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 30 to 60; but they are always more closely united in the lowest portion of the ileum. The dimensions of the separate patches are in general the larger the closer they are to the cecum; their length is usually $\frac{1}{4} - \frac{1}{2}$, may diminish to $\frac{1}{4}$, and increase to $\frac{1}{4} - \frac{1}{2}$, or even 1'; their breadth is about $\frac{1}{4} - \frac{1}{2}$, may diminish to $\frac{1}{4}$, or even 0.09. In these patches the villi are very short, and the crypts of the villi are very deep. The epithelium of the villi is rather ciliation, and the base of the villi is thick. The young villi of the follicles of $\frac{1}{4} - \frac{1}{2}$ in diameter, either rounded or slightly conical towards the intestinal cavity, which lies partly in the mucous membrane itself, partly in the submucous tissue; and are of the one side not more than 0.09, or are distant from the mucous surface, while on the other they are in immediate contact with the muscular tunica, which is here somewhat more closely united with the mucous membrane.

Villi from the interior of the intestine their most striking feature in man is the presence of many small rounded depressions $\frac{1}{4} - \frac{1}{2}$, 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 reticulated folds, and by the apertures of the Lieberkühnian glands; the latter are disposed around the slight elevations produced by the follicles in circles of 6 to 10 and more apertures, the corona tubulorum of authors.

The Solitary Follicles (glandulae solitariae) resemble the separate element of Peyer's patches so closely in size, content, and general structure, that there is no reason for considering them as distinct, particularly as the number of follicles per centimeter is the same as in the Peyer's patches. Animals at least, we find Peyer's patches with 2—3—5 follicles.

In man, as all writers justly agree, their number is exceedingly inconstant; sometimes not one can be found. In the small intestines of the whole species of animals, the origins 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 covant in newly born children, being more abundant in the jejunum than in the ileum. The military vessels however, which are often met with in immense quantities in the small intestines and stomach in cutaneous affections of the alimentary tract, may be very probably or partially pathological, since the mucous membrane of the latter has been demonstrated in other organs also (in the liver according to Vorhow). The solitary follicles have the same structure as the elements of the patches, 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 on the notion that the follicles of Peyer's patches have any aperture. Of their functions he says: They are the follicles of the intestine, in general: the closed 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 lymphatic follicles, which are elaborated from the plasma, supplied by the blood-vessels, and perhaps also from matters not of a fatty nature, absorbed from the intestine, a part of which in all probability is at
pieces in this manner was a portrait of Napoleon I. in the garden of Malmaison, the engraving from which, by Lingay, had a great run. This style was however soon abandoned by Isabey, who, having resolved to try whether, by carrying the principles of high art into miniature-painting, he could not elevate that branch of art in public estimation, executed in 1829 a piece of unusual size, containing a small figure, of "Le Reve de Premier Consul dans la cour des Tuileries." It caught the public taste, and established the painter's reputation, as the first in his line. From that time Napoleon and Isabey were the most frequent miniature-painters of the day. Whilst Napoleon I. 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 painted many of the miniature-portraits of Napoleon I., the empress, 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 one on 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 de Porcelaine, is placed in the collection of the Oberkampf Government. He was so wisely entrusted 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 occasion of Napoleon I., Isabey accompanied the empress Marie Louise to Vienna, 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 Egypt, Isabey received a warning from the police, and prophesied the emperor by presenting him with a miniature of his son, which he had just painted at Vienna. The restoration of the Bourbons 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 ill-luck 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 XVIII., and as long as he continued to paint 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 lived till the last of the old age from the works he executed, as also by a good deal of mannerism.

ISARI, a genus of Cephal. belonging to the division Trypocopris, and the tribe Isarini of Léveillé. It is characterised by a compound, solid, capitalised, or elongated receptacle. The species are found parasitic upon caterpillars and the larvae of various insects. Robin enumerates the following species:

1. Isateratorum has been found upon the Carabidae in the autumn of the year.
2. I. floccosus, upon the larvae and chrysalides of Bombyx Jacobeus.
3. I. stirigosus, upon the chrysalides of Notus Upsilon.
4. I. arachnophilus, upon small spiders belonging to the genus Thoreutis.
5. I. lepra, upon the chrysalides of Notus inestabilis.
6. I. Tortaricus, observed by Robin upon an unknown spider, in the autumn.
7. I. crassus, upon decaying chrysalides.
8. I. ephebopus, upon a dead hornet.
9. I. exodeus, upon the larva of a moth.
10. I. Araneanum, an American species, found on spiders in Carolina.
11. I. Spinipalbus, also found in America, upon the caterpillars of the silk-worm moths.
12. I. giganteus, found upon a Mygale in the island of Cuba. (Robin, Histoire Naturelle des Versaphraes.)
ISATIC ACID. [CHEMISTRY, S. 2.]
ISATIN. [CHEMISTRY, S. 2.]
ISATINIC ACID. [CHEMISTRY, S. 2.]
ISATYDE. [CHEMISTRY, S. 2.]
ISERINE. [TITANIUM.]
ISLEWORTH. [MIDDLESEX.]

ISMAIL, a strongly fortified town of Turkey, in the province of Silistria, is situated on the left bank of the northern or Kilis arm of the Danube, 90 miles east from the mouth of the Pruth, and about two miles that distance from the Black Sea, in 45° 21' N. lat., 28° 50' E. long., and has about 20,000 inhabitants. It was taken by storm by the Russians under Suwaroff, Dec. 28, 1797, 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 ruined condition till 1812, when it was ceded to Russia by the treaty of Bucharest. Since then it has been rebuilt, and now contains about 2500 houses and 12 churches. The Kilis 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 Sapotoaceae. It is distinguished by the stamens being all fertile, and twice as numerous as the lobes of the corolla.

1. Gutta (Hooker), the Gutta-Percha Tree, has its leaves on long stalks, when they unfold, a brown point golden beneath; flowers axillary, fasciil.; 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 ' PERTA ') is, like Caoutchouc, a carburet of hydrogen, and isomeric with that substance, and possesses a great number of the properties which characterise India-Rubber (Cacoonroone), but exhibits certain special properties which admit of its being applied to particular uses to which caoutchouc is not adapted. Gutta-Percha possesses so 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, provided 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 territori-al zone which extends between the tropics, the Isonandra Guttta 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 it has been almost exclusively obtained from Singapore. It was brought for the first time into England in the days of Tradevant, as a curious product, under the name of Masser.

Wood; and subsequently it was frequently brought from China and other parts of the East, under the name of India-Rubber, in the form of elastic whips, sticks, &c. In 1843 Dr. D'Alemaud and W. Montgomery drew particular attention to it, together with its various singular properties, its easy manipulation, and the uses for which the Malay employed it. The most common employment of it was for whips; and it was by the introduction of a horse whip made of this substance, that its existence was for the first time known in Europe. The specimens of the products of the East Indies, shown in the Great Exhibition of 1851, proved that the natives of the country in which the X. Guttta grows know also how to appropriate it to the manufacture of different kinds of vases, and that European industry has little more to do than to imitate their processes.

The importation of Gutta-Percha into England, where the employment of this substance first drew attention, was in 1845 only 30,600 lbs.; but in 1848 it had increased to above 3,000,000 lbs.; and during the following years the importation has amounted to a much larger quantity, and one which begins to cause some apprehension as to the possibility of the supply sufficient for the requirements of the novel uses in store for it in the future. It is true that during its use Gutta-Percha is but little consumed, and the waste from the articles in this material, submitted to a proper softening, can be made to serve new uses; nevertheless its constantly increasing consumption, added to the barbarous manner in which the product has hitherto been extracted, may well justify some apprehension.

During the first few years of the employment of Gutta-Percha it was the custom to cut down the tree for the purpose of obtaining the juice, which, left to itself, very soon allowed the Gutta-Percha to separate and coagulate of its own accord. There is reason to hope that European industry will soon be embarked in the cultivation of this product, and that the Niaso (which is the native tree that gives to the tree which produces Gutta-Percha), multiplied by means of a regular culture, naturalised in other countries than those to which it is indigenous, and worked by regular incisions, which will only take from the tree a portion of its juice without hindering its development, will be the means of furnishing at a low price a substance which is destined to render notable services to industrial and domestic economy.

The Gutta-Percha which arrives in Europe in the form of lumps of some pounds weight is far from being pure. The natives of the Malayan Archipelago make no scruple of introducing into it stones, earth, &c.; the presence of which in the interior of these blocks renders a purification indispensable, which purification however is capable of being attained without much manipulation.

Indestructible by water, and at the same time a bad conductor of electricity, Gutta-Percha has been found available for conning the metallic wires employed in the electric telegraph; and the use of this substance may certainly claim its share in the success of the submarine telegraph, by means of which London and Paris and the other great cities of Europe are now brought within a few minutes of each other. It may be conceived to what a variety of forms a substance can be turned which, becoming soft without altering at the temperature of boiling water, regains at the ordinary temperature the slight elasticity and the consistence of leather.

ITÁCONIC ACID. [CHEMISTRY, S. 1.]
ITCH-MITE. [ACARUS.]
IVINGHOE. [BUCKINGHAMSHIRE.]
JACK, a common name of the Fresh-Water Pike. [Esox, &c.]

JACK-TREE. [ASTRAGALUS.]

JACOB'S LADDER. [POLEMONIUM, S. 1.]

JAMAICANA. [CHEMISTRY, S. 2.]

JANIPHA, a genus of Plants belonging to the natural order Leguminosae. [Rhabdos, 3-angled, subulate; calyx white, 4 or 5-cleft, sweet-scented; the terminal leaflet is the longest. The Common Jasmine has been a favourite flower of human beings for ages, and the more so as the fruit of its fragrance extends far beyond the season of its blossoms and even after the fruit is ripe. The leaves are fragrant to the touch and the plant itself is a very useful one in that it is easily grown in a pot and can be kept over winter.

J. officinale, Common Jasmine, is a native of the South of Europe. It has opposite leaves, pinnate; leaflets ovate-acuminate; buds acute. The flowers are fragrant, white, and the branches angular. Calycine segments 5, subulate; corolla white, 4 or 5-cleft, sweet-scented; the terminal leaflet is the longest. The Common Jasmine has been a favourite flower of human beings for ages, and the more so as the fruit of its fragrance extends far beyond the season of its blossoms and even after the fruit is ripe. The leaves are fragrant to the touch and the plant itself is a very useful one in that it is easily grown in a pot and can be kept over winter.

J. grandiflorum has opposite pinnate leaves, leaflets blunted, the outer ones 3 to 5-cleft, 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.

J. wallichii is also thought to be electeric.

JATROPHA, a genus of Plants belonging to the natural order Euphorbiaceae. It has monocious flowers; a 5-parted or lobed calyx; corolla 5-parted or absent; stamens 8 or 10, with unequal anthers, epicalyx filamentous; styles 2, bident or dichotomous; fruit a capsule.

J. curcas, Physic- Nut, is a very common small tree, or bush, on the coast of Coromandel. The bark is smooth and light brown-coloured; leaves scattered, stalked, broad, coriaceous, 5-angled, smooth, about 6 inches long, with very large yellow flowers. The male flowers at the extremities of the ramifications on short articulated pedicels, and the female flowers in their axils. The fruits are large, hard, baccate, and a small one below each subdivision of the pinnate, 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, the central one very thick, columnar, the 5 exterior ones diliform towards the base, adhering to the central one, all erect, and a little longer than the calyx; anthers 10, sagitate, equal; stigma 5 supported by the large general filament, and 1 by each of the others. The leaves are rugulose and discous; warm and rimed with castor-oil, they are applied by the natives of India as poisons. The seeds are violently emetic and diuretic; their expressed oil is reckoned a good application in itch and scabies, and also a little diluted, in rhinorrhoea. The leaves of the green jatropha are considered useful in cases of asthma, and the juice of the seed is used in cases of 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. glauces is found in Arabia Felix. It has leaves from 3-5 lobed, mucronate serrate, toothed; petioles nacked; stipules palmate, with serrate branches, glandular at the apex. The seeds yield a stimulating oil recommended by the Hindoos as an external application in cases of rheumatic and paralytic aches.

J. glandulifera is a native of the East Indies. The leaves about the extremities of the branchlets are alternate, petiolated, and generally palmate; the lobes from 3 to 5, oblong, serate, with each serrature ending in a short green glandular-bearded bristles; stipulas briefly; many-cleft, each division ending in a glandular head; petals 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 subterminal in the divisions of the panicle. The pale or greyish-coloured thin juice which exudes from a fresh wound is employed by the Hindoos as an escharotic to remove films from the eyes.

J. mucronata is a native of tropical America. It has palpably 11-lobed smooth leaves, the segments wedge-shaped and pinnatifid; stipules setaceous, multifid; flowers coriaceous, 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.
JAY REV. WILLIAM, was born on the 8th of May 1760 at Tisbury, Wilts. His father, who was the son of a small farmer, worked as a stone-cutter and mason, and young Jay first employed in these trades, before he was placed under the tuition of the Rev. Cornelius 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 permitted to preach before the age of sixteen years. For about a year he officiated as the minister of Lady Maxwell’s Chapel at the Hotwells, Clifton; and on January 31st, 1791, he was settled as pastor of the church assembling in Argyle Chapel, Bath, a position which he maintained until the close of 1806, when he retired from the pastorate in January 1806, 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 own denomination, that of the Independents. His published sermons have had very 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 receiving. He was a pious and learned man, and his orations so useful 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 the art of memory, and by a full command of his excellent vocal powers. Mr. Jay’s regular congregation was large, and visitors to Bath usually repaired to his chapel to hear him preach. He generally made an annual visit to London and the seat, and in the metropolis and 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 3rd of February 1812, and in the evening, the sermon was delivered and the address containing his orations 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 and the Rev. John Lectures on Female Scripture Characters’ (published since his death); and an Autobiography, from which and other sources a memoir of Mr. Jay was prepared by the Rev. Dr. Redford and the Rev. J. A. James, and published in 1854. A uniform edition of Mr. Jay’s works was published under the author’s superintendence in 1845-49 in twelve volumes, post-ovato.

JEFFREY, FRANCIS, was born in Edinburgh, on the 30th of November 1776, in the upper part of a house now numbered 17, Charles-street, George-square. His father, George Jeffrey, was one of the debtors of the University 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 class-followed, while he was under Mr. Fraser, used afterwards to remember him as a little clever, anxious boy, always near the top of his class, and who never lost a place without shedding tears.” From Fraser’s class, he went to New College, where he was in 1795 to that of the rector, Dr. Adam, the author of the ‘Memoirs of the Reformation’ 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 good old man. It was in the winter of 1796-78, while still attending Dr. Adam’s class, that Jeffrey, then a boy in his fourteenth year, saw the post Burns. He was walking along the High Street, when he was arrested by the appearance of a man on the pavement, whose air and manner, seemed to be from the country, but in whose dress otherwise it was something uncommon. It was Burns, then on his first visit to Edinburgh, and as the “little black fellow was gazing at him, some one standing at a shop-door near said to him “Ay, lad, your hat is very nice.” Jeffrey, as he looked at the Burns’ hat, 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 was to add by improved and increased), and the moral philosophy class, then taught by a Professor TORY, and likely to regard the teaching of a Whig like Mair with suspicion. Jeffrey’s class-fellows at Glasgow remembered him afterwards as being there one of the cleverest of the younger students, somewhat, ‘petulant’ in his manner, and assiduous in his studies. Mair insisted on wearing on his upper lip in spirit 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 even then 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 serious and versetale reading, and of note-taking and essay-writing for the purpose of stores of information. He was assiduous after his removal from Glasgow back to Edinburgh in the year 1789. In his little room in his father’s house in the Lawmarket, he read and wrote, filling quires of manuscript with notes and abstracts from books, his mind always busy with some new project. Biog- phographer 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 had altered the Scots law and the civil law, and was at 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 receive a letter from his father, and his friend during his stay at Oxford, “I see nothing that is possible to acquire in this place.” On his return to Edin- burgh, in July, 1792, his friends found that his stay at Oxford had altered him in at least one thing: he no longer spoke in his former natural Scottish accent, but in a sharp and, as some thought it, an affected English style of pronunciation. “Jeffrey,” 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 friends, who knew his real intellectual force and the genius 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 in the broad Scotch accent of his 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 the University to come a merchant; but the legal profession was at last definitely resolved on. In 1792-93 he again attended the law classes of Edinburgh University under Professors Hume and Wylie, as also the class of history under Alexander Tyler. Strange to say, he did not attend Dr.land Stewart—Stewart Wigham being an object in his father’s eyes. On the 12th of December 1792 he became a member of the famous Speculative Society, then at the height of its fame; and here he first formed the acquaintance of Scott and many other young men of the most promising and distinguished. The distinction to lawyers, literary men, and statesmen. For several years Jeffrey was one of the ornaments of this society, reading essays in his turn, and figuring with peculiar eclat in almost every debate. In short, it is said of Jeffrey, as well as of Horner and Brougham, that never in their most glorious days did they speak better than they did when young members of the Speculative. Already in their debates, Jeffrey, despite the Toryism of his father, had to show his Whig principles. While this was so, he continued his habits of various though desultory reading, and of incessant composition in private on all sorts of subjects. He had even a dream at this time that he was to be a great man, and that his father was to give him a great quantity of verse. Of this verse Lord Cockburn says, from inspection, that though “viewed as mere literary practice it is rather respectable,” “it could not have been accepted.
as poetry. He adds that in one constitutional quality of the poet, Jeffrey was certainly highly endowed—the love of 
extremes. When Whig, his part was the extreme Whig, his 16th of December, 1794, Jeffrey was called to the Scottish 
Bar. It was the time when Scotland was politically stagnant under the so-called Dundas reign; when the whole country was managed by corruption and patronage; when such a thing as the press or the press was unknown; when through the press was unknown?; when through four-fifths of the entire population a half who then constituted the population of Scotland was Tory, at the absolute bidding of Dundas; and when such few leading Whigs as there were in office were out of the way. On the whole, the Whig party however was increasing; and year after year year new lawyers of talent were attaching themselves to it. Among these young Whig lawyers, beating their heels idly in the Parliament House with no chance of briefs, and amusing themselves by social meetings at each other's lodgings and by essays and debates in the Speculative, Jeffrey was confessed among one of the chief, if not the chief. His prospects of practice were so small that for a time he had ample leisure for his literary essays. He began the 'Monthly Review' and other periodicals; and for a time contemplated the pursuit of literature professionally. In 1800-1 he attended Dugald Stewart's lectures on political economy. At last, in November 1801, his talents as a political writer were noticed, and he was invited, at a convivial meeting of Jeffrey, Sidney Smith, Horner, and Brougham, that the 'Edin-

burgh Review' was projected. Smith was the originator of the idea, but the others immediately concurred, and Constable, a man of the same interests and standing, joined the work. The first number of the new journal came out on the 10th of October, 1802; that number and two more were edited by Smith; but, on Smith's return to London, the entire management devolved on Jeffrey.

The great fact in Jeffrey's life, and that which makes his name memorable in the literary history of Britain, is that for a period of twenty-six years (1803-1829) he was the editor of, and one of the principal contributors to, the 'Edinburgh Review.' With the history of that journal, his career was identified, and he is inextricably linked to it. To use Jeffrey's own phrase, it stood on two legs—the one leg being the criticism of current literature; the other being Whig politics. Both as a literary critic and as a politician, Jeffrey was the leading Whig in Britain during his lifetime, and his articles in both capacities; to estimate the vast influence exerted by the 'Review' during his management, on the contemporary literature and contemporary politics of Britain; to revive the numerous controversies both literary and political, in which the 'Review' was engaged; or to reconsider the right and the wrong of its literary judgments, in particular, on the distinguished poets of the period, such as Scott, Byron, Southey, Cler poz, Wordsworth, &c., is here unnecessary. All this belongs to the well-known literary history of the first quarter of the present century. Suffice it to say, that Jeffrey's honesty in the expression of his opinions was never doubted; and that, where he was wrong, it was because his judgments, though honestly given, were limited by the essential nature of his own intellect. As a literary critic, he proceeded on what has been called "the beauty and blemish" principle of reviewing; that is, it was his regular habit first to state in clear, sharp, ornamental language what he considered the "beauties" of a poem or other work, and then to add a healthy influence on the mind, by his chastisements. And, although in following this method, he undoubtedly remained constitutionally insensible to the higher poetry of Wordsworth and his kindred consociates, he undoubtedly influenced a healthy influence on the minds by his chastisements. Where he praised, he praised heartily; and it is to his credit that, if his negative judgments have not been always ratified, his favourable decisions generally have. In politics there is now less question as to the value of his influence in promoting what was on the whole good and useful. He was uniformly on the side of progress and improvement; and, though he never was a Democrat, nor what would now be termed a Radical, but only a moderate Whig, it was in the spirit of that Moderate Whig, that is significant of the adaptation of his writings, both literary 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 1845, the work did not meet with the same success as much of the literature of the former part of the century. So far as his literary merits are concerned, it has been accorded 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 were recognized by a number of his contemporaries. In such respects he was not without a rival at the Scottish bar—combining good knowledge of law with singular perspicuity and ingenuity, and a rapid, fluent, and brilliant style of eloquence.

As a speaker, he was regarded as a very able advocate. His most frequent practice was as a defendant 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 piece of forensic art 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 Edinburgh, when he was generally involved in important cases. With his gradual increase of practice his wealth increased correspondingly, till at last he was in the receipt of a handsome annual income. But his wife did not live to share the full flush either of his fame or his fortune; she died at sea, during a voyage to Spain, in December, 1806, to distract his mind from this calamity, that the famous 'leaderless' duel between Jeffrey and Moore took place at Chalk Farm—occasioned by Jeffrey's notice of Moore's early poetry, and immortalized by Byron's reference to it in 'English Bards and Scotch Reviewers.' Jeffrey and Moore 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 conflict of interest, he became a friend of his. 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, Moore 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 conflict of interest, he became a friend of his. 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.'
through new phases of his life. In 1830 he was elected a member of the first parliament of William IV., being returned for Northumberland, and Douglas-Jerrod. 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 the Reform debates; and in the end of that year he was not returned. He was a member of the Reform Committee, and in 1836 he was a partner of Edinburgh, along with Mr. Abercromby, the speaker (now Lord Dunfermline). He remained in parliament till 1834, and was Lord Advocate of Scotland under the Grevy government. His parliamentary life was not an exciting one, the expectations that had been formed of 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 parliamentary life. He retired to the Isle of Jersey, and henceforward was distinguished 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 on 6th November, 1850, at Craigie, on the 26th of January 1850. In the relations of private life, Lord Jeffrey was a singularly affectionate and amiable man, soft-hearted to a degree which surprised those who, till they knew him, had figured him only as a sharp and severe in the abstract. Lord Jeffrey's secret reserve is to be gathered from the selections from his correspondence published by his friend Lord Cockburn, as an appendix to his Biography, in 1852.

JERROLD, one of the geniuses of Mollusca belonging to the family Littorinidae, established by Mr. Alder, and named after Mr. Jeffreys of Swansea. The species were originally referred to Rissoa. Forbes and Hanley give two species, J. diaphana and J. opalina, as inhabiting British seas. In the N.T. 118, N. lat., 70° 36' E. long., in the valley of the Cabul River, on its right or southern bank, at a nearly equal distance from Cabul and Peshawar. Though the river begins to be navigated by rafts at this place, Jellalabad does not appear to be a commercial town. The ordinary population is between 2000 and 3000, but this is much increased in the winter season. The houses are low, and the streets narrow. The town was occupied by the British during the Afghan war, 1839-42. General Gough and Sir John Prendergast attempted its capture, but were repulsed by General Khan, who besieged the place with a large force in January 1842. At the conclusion of the war the British forces under General Pollock left Jellalabad in October 1842, first destroying its masts and the fortifications which had been erected for its defence.

JERROLD, DOUGLAS. With the higher order of minds every surrounding circumstance, especially of their earliest years, is education. The education of the child Douglas Jerrold was sometimes a laborious one of a father; the education of the boy was on the deck of a man-of-war; the education of the youth was in a printing-office. We can trace the fields of observation in which the dramatist, essayist, and journalist gathered his materials, and in which his habits of thought and study were formed. Douglas Jerrold was born in London, on the 3rd of January 1803. His father was manager of the Sheerness Theatre: the "many-coloured life" of the drama was thus familiar to him in his first years; and those who have known the boy, must have been conscious of an intense spirit in him to which faultless love will one day receive will understand the influence of this experience upon the pursuits of the man. But the boy was surrounded by grand and most attractive realities: the docks and arsenal of Sheerness—ships coming home to refit after tedious cruises—seamen who could talk of the Nile and Trafalgar. The lad, delicate, sensitive, was smitten with a passion for the life at sea; and, his wishes prevailing, a midshipman's appointment was obtained for him from Captain Beaufort, by brevet of Adm. Curtis, the novelist. At the end of the war he quitted the navy, not long after the first of August, having had to be chosen. He was apprenticed to a printer in London. The labours of a printer's apprentice are not ordinarily favourable to intellectual development; the duties of a compositor are not conducive to forcible mental and emotional development. But Douglas-Jerrod was so inattentive to the subject-matter of his employ that he rarely engage his thoughts. It was not in the printing-office that the mind of Douglas Jerrold was formed, although the aspirations of the boy might have thought that there was the sphere in which he might find a footing. The labours of a printer's apprentice were not the ones in which he aimed at popularity by false and dangerous doctrines upon the great principles of society and government. Its success,
compared with its previous position, is one of the many proofs that the largest numbers of readers are not to be pro-
 precipitated by what has been falsely considered as essential to
popularity—to write down to an iniquitous low intellectual
standard. Douglas Jerrold died June 8, 1867, at his residence,
Kilburn, near London. The amount derived from some per-
formances in honour of his memory was invested for his
widow and daughter. A pension of 100l. has also been
granted.

JERVIN. [Chemistry, S. 1.]

JET. [Coal, S. 2.]

JOHANNUT, TONY, was born at Offenbach, November 9,
1838. His father, Alfred, has been long known in
England as a designer of books. Tony, as his brother,
Tony commenced his professional career as an engraver. His
first painting was exhibited at the Exposition of 1851, 'On
Soliel' buvant à la porte d'une Hôtellerie.' Like his brother
he looked to English as well as French history and literature
for subjects for his pencil. Among his chief pictures are enu-
merated the 'Chanson de Dougs' (1838); 'La Siste' (1841);
'André et Valentine' (1844); 'Bataille de Fon-
tesey; now at Versailles; 'Petite Bracooniers' (1846); and
'Ecume de Plage' (1851). Though on the whole less suc-
cessful than his brother as a painter, when, like him, he
turned to designing for the wood-engraver, he proved at least
equitably happy; and as his life was more protracted, he
enjoyed a more material success. We have mentioned his
crucial. Among the more important of his book illus-
trations may be mentioned 'Werther,' the designs for which he
etched himself; Molière's works; 'Manon Lescaut,'
'Jérôme Patouret,' the Romances of George Sand; and
the 'Voyage d'Olivier,' of Galsworthy. His illustrations, though not un
erroneously exaggerated, and sometimes vetrica on caricature, are almost always cha-
acteristic, and full of knowledge and refinement, rendering
the books he illustrated among the very best examples of
their age. He died suddenly from an attack of apoplexy,
April 8, 1892.

JOHNSTON, JAMES F. W., late Professor of Chemistry
in the University of Durham. He was born at Paisley,
Ayrshire, July 24, 1842. After leaving the University of
Manchester, and afterwards returned again to Scotland,
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 1855 he removed to Durham,
where he opened a school. In 1850 he married the daughter of
Thomas Ridgely, Esq., of Park-end. By his marriage his circumstances were so much improved that he gave up his school work, desiring to devote himself entirely
long conceived of devoting himself to the study of chemistry.
He accordingly removed to Sweden, and became a pupil of
the celebrated Berzelius. He made so much progress in his
course of study that he was enabled to take the readership in
chemistry and mineralogy in his university. After his return to
Edinburgh, and resuming his occupation in Durham he
was invited to take the readership in chemistry and
mineralogy. This took place in 1853, 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 depart-
ment of agricultural chemistry he became appointed chemist to
the Agricultural Society of Scotland. On the dissolution of
this society, he left Edinburgh, and resuming his occupation
in Durham. He now occupied himself principally with the
production of works on the relation of ch-mistry to agri-
culture. In this he was very successful, and few writers have
been more extensively read in this department of literature.
His 'Lecires on Agricultural Chemistry and Geology' are
an able exposition of the application of the principles of
chemical and geologcal science to the art of agriculture. He
did also publish a 'Catechism' on the same subject, which at
the time of his death, in 1855, had gone through thirty-
three editions. His writings were 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 as large a circulation as in his own country. To the writers of the leading periodicals, such as the
work entitled 'Notes on North America,' in which he
"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
his knowledge. The principles of chemistry involved in the
ordinary occupations of human life are at present more
readily shown to be without foundation. This work origi-
nally appeared as a series of magazine articles. Professor
Johnston contributed to the 'Edinburgh Review' and other
journals. He has also published many papers in the Tran-
sactions and other scientific journals. In the autumn of
summer of 1853 he was travelling on the Continent in his usual
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 September of that year. He was made a Fel-
low of the Royal Society in 1837, 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 the facility with which they can be formed, not for any public or administrative
purpose merely, but for carrying on a business with a view to
individual profit. They possess other peculiari
equally deserving of notice.

This system of association, which has received such
admirable development since [1850], is in England, in
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 sea-
ports and other towns of the kingdom. The trading
fraternities generally became in course of time chartered
companies, each possessing the exclusive privilege of
pursuing the particular occupation which it professed to
perform. The institution of these companies was followed
in the municipal corporations, the franchises of which
could in many cases be enjoyed by those only who were
free of one of the companies into which the community was
divided. In this position they remained until the Municipal
Corporation Reform Act.

Besides these guilds, or companies, other trading associations sprung up from time to time. The
genereal company of Germans, called also the Merchants of
the Hanse, dates from 1290, and became in the fifteenth cen-
tury the Company of the Merchant Adventurers of England, as the hankiers.

In the seventeenth century, the speculative mania,
remembered in connection with the famous South Sea Com-
pa.ny; of which we have seen counterparts more than once
since the middle of the nineteenth century, was occasioned by
this novel development of the associative tendency, the
'bubble Act' (6 Geo. I. c. 18), was passed, declaring all companies
which presumed to act as corporate bodies, and to pretend
to raise transferable stock, public nuisances, and the pro-
cumbly and stability of the country. Its provisions were
directed not so much against the offence of acting as a cor-
poration without authority, as with a view to prevent the
frauds of unprincipled adventurers, who prop-ed schemes
merely as a pretext 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 'Buble 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 realising outstanding projects of incorporation and therein was 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 incorporated under Acts of Parliament, and in particular 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 assistance of funds, where necessary, was no doubt given 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 the protective 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 assemblage of adventurers cannot, for instance, by any agreement among them-eves, sue or be sued in 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 personally answerable for his share of the debts, and accountable for 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, the legislation relating to them has not been altogether consistent.

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, auditors 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 periodical meetings of the shareholders. In the absence of legislative definition, 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 concluded that no person should be entitled 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 deemed recently insufficient.

As joint-stock companies, however, increased in number and in 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 3 4 Will. c. 91, which enabled the Crown, in a charter of incorporation thereunder to be granted, to provide that the members should be individually liable for the debts and engagements of the corporation. This Act proving inoperative, another mode of proceeding was tried by 4 & 5 Will. 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 direction by 7 Will. I. c. 95, and 1 Vict. c. 73. At length the 7 & 8 Vict. c. 49, 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 limitation, whereby the company was limited to what was called a nominal capital, for the purpose of carrying on the 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 regulations obtained the corporate privileges which they were now enabled to do; but before long the affairs of several became involved; and the difficulties which then presented themselves in attempting to adjust the rights and liabilities of the parties had so much impressed the shareholders led to the repeal of the Registration and Winding-up Acts, c. 11, & 12 Vict. c. 45, and 12 & 13 Vict. c. 108, which for 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 companies was unmistakable, and the public declared, 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 Winding-up Acts, and to a total remoulding 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 20 & 21 Vict. c. 14.

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, was declared in the statute. This statute containing the main principles 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 the few simple rules, whereby the personality of the company 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 Standing committees, where 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. Trading 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 such company Act 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. 16. This statute contains 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,' 1845, was at the same time, consolidating all those provisions which it had previously been necessary to include in 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 the 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 preceding 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 governed by the statute 7 & 8 Vict. c. 113, but must now be registered under the "Act for the prevention of the corporate frauds mentioned in the statute, 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," 1856 and 1867, under which seven or more
persons may, by subscribing a memorandum of association, and otherwise complying with the requirements of the statute in respect of registration, form themselves into an incorporated company, with or without limited liability.

This registration is obtained by delivering to 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 such persons as from time to time may be admitted to the shareholding, become the shareholders of the company, and thereby acquire the rights of a body corporate, hereby forming 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.

Every member shall hold himself forth as one of those who are members liable either with or without limit, according to the wishes of any member who may adopt the principle of limited liability or not. Where the liability of the shareholders is limited by the memorandum of association, the word ‘limited’ must be the first 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 registrar of 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 by the Board of Trade, and the statutes contain a complete code of regulations for winding up a company unable to meet its engagements, or which it is thought desirable to wind up for other reasons. Directors, who do not obtain success by profit or the satisfaction of the subscribers, are likely to be severally and severally liable to the extent of the dividends, for all the debts of the company; and every person personifying or carrying on the business of the company when the number of the partners is less than seven, is severally liable for its debts.

This species of corporation 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 to which that period is referred; or 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 of its incorporation, or suspends business for a year; 3. Whenever the shareholders are less than seven in number; 4. Whenever the company is unable to pay its debts; or, 5. Whenever the amounts of the капитал have been lost or become unavaileble.

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 months elected to pay the amount owing, or to secure or compound for it, without 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 limited 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. 526.)

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 honour, he entered the divinity department of the Seminary; and whilst there, a student by Dr. Claudius Buchanan, which he was called to meet with, turned his thoughts towards the missionary service in India. Some fellow-students, to whom he communicated his views, became similarly impressed, and they even went before 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 it was advisable to institute a ‘Board of Commissioners for Foreign Missions.’ Whilst this board was in process of organisation, young Judson proceeded in 1811 to England, to consult with the directors of the London Missionary Society. On his way the vessel in which he sailed was wrecked, and carried into Bayonne, but Judson was released, after a short detention, at the intercession of some of his countrymen. In London, he received only qualified promises of aid, but the American Board of Commissioners, re-
where they met with a warm welcome from Dr. Carey and the Scaramore missionaries, but the Benga government, resuming their authority, abruptly ordered Judson and his companions to return to America by the same ship in which they had arrived. Judson however was not disposed to give up his purpose so easily. He accordingly took a passage to the Isle of France, proceeded there from to Bombay, and thence (via Ceylon) to England, 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-baptized by immersion. He was rejoiced at the change, he said, and in consequence resigned his connection with the Board of Missions; and when he landed at Rangoon to commence his missionary work he was unconnected with any society, and without any means of future support. He addressed himself however with great success to the acquisition of the Burmese language 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 devotion, had promptly formed a missionary society to support him, and sent him out some assistents, one of whom was a printer. The Scaramore missionaries presented a printing-press and a font of Burmese type, made for them out of pewter, and personally instructing the natives, but desiring to benefit those whom his voice could not reach, drew up in Burmese a 'Summary of Christian Doctrine,' which was the first work issued from the Rangoon press; and portions of scripture and sermons were also prepared. As a native work Mr. Judson made visits to other Burmese towns, and to Ava, where he had an interview with the king; and, having obtained permission set about establishing schools, in which he had also mastered the language, was a very earnest and successful helper. The mission was going on favourably, when the sovereign of Birma provoked the English to declare war. Rangoon was made a point of attack by the British forces; but before they arrived, the other towns, was seized and put into prison. There he remained for several months, subjected the greater part of the time to the most cruel treatment; but at length, when the success of the English was beyond question, he was employed to act as translator for the Birman government, and Mrs. Judson was sent to 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 28, 1826, during his absence 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 Bible into the Burmese tongue as one of the most important duties of a missionary's 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 6th of April, 1834, it was finished. The first volume, in 8 vols., was published. But he soon became convinced of its 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 tongues. It is almost as soon as this printing of this revision was finished, the Bible was published, with characteristic energy Mr. Judson commenced at Moulinez, and under his brother-in-law. He then removed, the preparation of a Burmese Dictionary. But his ill-health interrupted the work, and the health of his wife failing also, he determined to return to Am-rica, in the hope that their native air might restore their vigour. Mrs. Judson died off St. Helena (September 1st, 1840), but he arrived in safety at Boston a month afterwards. His reception by the various religious societies in America was of the most cordial kind. Special services were every-where held in his honour, and wherever he went, was met and greeted him. His stay however was but brief, he had determined to return, and if possible, end his days in Birma. But he did not return alone. Anxious to find some one qualified to take the place of his wife, he sent to England (the first he had already written), he was introduced to an accomplished young lady, Miss Chubbuck, whose writings under the pseudonym of Fanny Forester, had had an un-usually large amount of popularity in religious circles; and he not only undertook to write the life of the deceased Mrs. Judson, but soon consented to become the third. They were married in June 1846; in July they embarked at Boston, and in December they landed at Moulinez. 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 England, in March 1851. He embarked, but the Ganges rapidly worse, and died at sea on the 12th of April 1852. His 'Burmese and English Dictionary' was completed from his papers by Mr. E. A. Stevens, and printed at Moulinez in 1852. It is regarded as a work of great value, and in fact the first of its kind written in the Burmese language, and is a valuable contribution to the study of that language and of the history of India.

Several Lives of Mr. Judson have been published, of which the list of the most important may be given for the present:

J. R. Wylie, 'Memoirs of Mrs. Judson,' 1856; Fanny Forester, 'The Records of Alderbrook,' a work very popular in America, and once reprinted in England; and Mrs. Judson's own work, 'Secret.' 'Missionary Biography;' 'The Kathayan Siva;' &c. She died June 1, 1854.

JUGLANS. [WALNUT-TREE.]

JULIUS, a genius of Fishes belonging to the family Chondrostei, and the order Acipenseridae. It is a smallish and gill-cover without scales, the lateral line bent suddenly downwards when opposite the end of the dorsal fins. In other respects this genus resembles Labrus. [Labrini.] An example of a very beautiful species of this genus, known under the name of the Rainbow-Wrasse, was described by Donovan as taken off the coast of Cornwall. It is the J. Mediterraneus of Risso, the J. vulgaris of Fleming and Cuvier. This fish is most remarkable for its varied colours. Its back is greenish-blue; the longitudinal band is orange; beneath it are yellowish-coloured bands on a silvery ground; the head is variegated with brown, yellow, blue, and silver; the dorsal fin orange, with a purple spot on the membrane connecting the three spinous rays. [Yarrell, British Fishes.]

JUNIPERUS, a genus of plants belonging to the natural order Junaceae. This genus is distinguished by its inferior perianth, composed of 6 glumaceous leaves; its 3-celled 3-valved capsules, the seed-bearing dispersions of the valves being in their mature state; the seeds are found mostly in moist boggy situations in the colder parts of the world. Several species are of great importance to the horticulturist.

J. effusus, the Soft Rush, and J. communis, the Common Rush, are used in making of the country for placing into mats, for chair-bottoms, and for constructing small lady-baskets. The wicks also of the candles known as rush-candles are made from the pith, or more properly speaking the softer inner portion of the stem of the same species which is used as tinder. The rush-cane is cultivated in Japan like rice entirely for making floor-casts.

Rushes of various kinds form frequently very troublesome weeds in agriculture. They grow best on rich land that is wet and cold. The stems are often planted during the winter over with dry materials of various kinds, as ashes, lime, and drift from roads; but the best mode of getting rid of them is to fork them up by the roots in the summer, and after let them lie for a fortnight or three weeks to dry them there, and then plant them in the field. Whether they be a proper mode of getting rid of them unless the ground on which they grow is well drained.

JUNGMANN, JOSEF, an eminent Bohemian lexicog- rapher, was born at Hudditsch, February 28th, 1671, on the 16th of July 1772. His father was a peasant, who especially occupied himself with the management of bees, and Jungmann, who early showed a literary turn, had much to
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 was admitted into 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 felt as a peculiar hardship the difficulty of obtaining a knowledge of his native tongue. 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, a habit which persisted in his exhortations, is now the ordinary language of Bohemian authors, who were formerly accustomed to employ either German or Latin. He studied first at Beranu, and then at the University of Prague; and in the year 1799 obtained an appointment in the University, a quality may ascribe to a 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, "Rope's *Elisa*," and "Messiah," Goldsmith's "Edwin and Angelina;" Gray's "Elegy in a Country Church-yard;" 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 "Novoexcâla Bibliotheca," published at Vienne, 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 conferred on him by the mayor of the city the year before, while his brother Jan read high mass as part of the ceremonies. Antonin, who has written several medical works in Bohemian, has also published an essay on the Sanscrit language, and Jan is likewise an author in the native tongue. In 1837 the labours of his compatriot Joseph von Schiller from the management of the gymnasium, but he was still occupied with correcting works for the press at the time of his death, on the 16th of November 1847. He had for several years been an assistant professor at the University, and was buried in the cemetery of Strahov.

Jungmann is the author of two works which are certain to preserve his name. One, the "Slovinic Cesko-Nemecky," the great Bohemian Dictionary, in five quarto volumes, containing at least four thousand pages of close print in double columns, is a stupendous monument of zeal and diligence, which the Bohemians proudly place by the side of Johnson and Adelung. The only other dictionary of a Slavonic language which can be compared to it is the Polish of Linde, which appeared in 1836, and was only an uncorrected reprint of the first edition of 1821. In conformity with its title, "Bohemian-German Dictionary," equivalent to the Bohemian words are given in German in this elaborate work, but the main mass of information which it contains is in Bohemian. The dictionary, even the Preface is given solely in Bohemian. This dictionary, which passed through the press between 1835 and 1839, was published at the expense of the Bohemian Museum, and in an imperial decree which was issued soon after its appearance, it was directed that the orthography adopted by Jungmann should be taken as a standard in the schools of the country. The triumph however was a short-lived one, for already in 1842 the Museum had adopted another system of orthography, to which Jungmann was obliged to conform in a later edition issued under its auspices, hoping, as he tells us in his "History of Bohemian Literature," that this new system might be the last. This "History" is his other great labour, and it is a most useful compendium of all who take interest in a curious branch of literary research. The first edition, which was issued in 1825, was out of print for several years before the appearance of the second, which Jungmann was engaged upon at the time of his death, and which was published in 1840. It is as much a model as his dictionary, the result of a complete Bohemian bibliography. The narrative portion, which is somewhat dry, hardly occupies a tenth part of the work, the remainder is a complete and minute enumeration of every book in the Bohemian language, with all its various titles and multiple editions and translations. Every author who could acquire information, from those of the earliest period, the manuscripts discovered by Hanka, to the year 1846. He even had the patience to form a list of the separate articles in periodicals, so that, with the assistance of every article, which of the works of Dickens, Scott, and Shakspere were translated into Bohemian by the year 1846, who were the translators, and when the versions appeared. The miscellaneous writings of Jungmann were collected in one volume, and published by the Bohemian Museum. They mainly consist of translations from English, French, and German, but there are some essays on the favourite subject of his native language, which are curious in matters and animated in the spirit of patriotism. JUROT ANDOCHE, DUC D'ABRANTES, was born at Bussy-les-Forges, on the 24th of September 1771, according to the Duchess's "Memoirs," whilst all the biographical dictionaries fix the date in October of the same year. He had been destined to the law, but the political events of 1791 induced him to enlist in the company of volunteers raised in the department of the Côte-d'Or; he soon distinguished himself, and his fellow-soldiers made him a sergeant on the field for one of his acts of daring. In that grade he was serving in the reign of Louis XVI, when Bonaparte, not yet a general, commanded the artillery, and having discerned the soldierly qualities of Junot, attached him to his person. The capture of the place raised the commandant to a general of brigade, when Junot was made a captain, and became the first aide-de-camp to General Bonaparte. For nearly two years he continued the sole aide-de-camp of General Bonaparte; he is even said to have shared his purse with his superior officer during the few months that he remained unattached to the 13th Vässelin in 1795.

He accompanied Bonaparte to Italy, in 1796, and was present at Lodi, Arcola, Castiglione, and Lonato, at which last battle he was badly wounded. In 1799, he took part in the campaign in Egypt, when at the combat of Nasare, with a troop of the guard, on horseback, he killed a thousand Mussulmans in check, till Kleber came to his relief. He greatly assisted Bonaparte on the 18th Brumaire, in overthrowing the Directory. For this timely service he was made Commander of Paris, in 1804, and carried the crown of the little Nicole de Dern argued (whose family had long been connected with that of Bonaparte) on the 18th October of the same year; and created a general of division in 1801. In 1804 he was appointed Governor of Paris. On the 1st of February, 1806, Bonaparte gave the title of Marshal to D'Abont, 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 possession of Portugal, and held his ground there for nearly two years, when Sir Arthur Wellesley's victory at Vimeiros, on the 1st of August 1808, and the conclusion of a treaty of peace by the peace of Tilsit, the battle, was followed by the evacuation 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 his star was lost. In 1812 he was made one of the regimented, and was estranged from his orders. In 1813 he was directed to join the grand armée, and the 8th corps was ostensibly placed under his command, but the orders from Berthier were transmitted 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 houses of his father, at Montpelier, on the 22nd of July 1813; 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 25th.

Lauride Paix, Duchess d'Abonts, was born at Montpelier, November 6, 1754, and was only sixteen when married to Junot, in 1800. She was a woman of great frankness of speech, and equally remarkable for the prodigality of her expenditure. As a consequence she was frequently obliged during her husband's life, and when his death and the fall of Napoleon had turned the tide of her fortune, she had no savings to support herself and family. She therefore had recourse to her pen for her subsistence. She wrote many patriotic and historical works under the title of "Souvenirs historiques sur Napoleon," published in 1831. As these memoirs contained many incidents relating to the early life of the French emperors, its success was universal throughout Europe. The Duchess d'Abonts died in extreme poverty on the 4th of June 1830.
K

KAFFRARIA. [KAFFRARIA.]
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. Pottinger—had endeavoured in vain to suppress these raids. In 1847 Sir H. Pottinger, at the instance of the settlers, sent out his forces, which their unseated resentment against the white settlers broke 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 service in the colony, and ordering all the white colonists between the ages of 15 and 50 to rise on command 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 Waterhoep, Lieutenant-Colonel Fordyce and several officers and men of the 74th regiment were killed, and a considerable number wounded; the Kaffirs escaping unharmed. 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, Sandili, and Kreil submitted to the British, and the war was virtually at an end. All the Kaffirs were notified to the General and the Kaffir chiefs 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, over which the British government holds the kind of overlordship 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 the chief river. A town called London is to be established at the mouth of Buffalo River.

KALE, or KAIL, SEA. [CHAMBER.]
KAISARIYEH, a town in Asia Minor, is situated in a plain to the north of the Brish-Dagh (the ancient Argea) in about 36° 44' N. lat., 33° 25' E. long., and has a population variously estimated at 25,000, 40,000, and 60,000, 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 800 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 subterranean exhalations. The town is extremely extensive and well supplied with European manufactured goods, woollens, silks, hardware, iron, &c. The Armenian merchants display their wares in a large place called the Vint Hoste, these consist of hardware, souf-boxes, glass beads, Red Sea shells for ornamentation, paper, cards, pellocks, &c. Of native articles exposed for sale the chief are yellow berries, which are grown in the plains of Cessarea, wool, gait-nuts, goats’ hair, trapascht, cotton, skins, fur, cotton-raisons and other fruits. Among the principal structures in the town are the mosques, the convent of Siddi-Battal, and some mosques. The Armenians have a bishop and two churches in Kaisariye; the Greeks also have a church. The manufactured products of the town are chiefly yellow marocco leather, cotton stuff, and cotton-yarn.

Kaisariyeh in site and sound is identical with the ancient Cessarea, the capital of Cappadocia, which was originally called Caesarea. The city of Cessarea was situated on the Meias, now called the Kara-Su, which was surrounded by the famous Arianathe. The city 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, Cessarea was made the capital. It became a place of great importance in the later times of the empire. When taken by Sapor in the reign of Valerian (about 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 rubble of ancient structures about the town. Cessarea gave title to a Christian bishop from an early period of the Church; it is the birth-place of St. Basil the Great, who became bishop of Cessarea, a.d. 370.
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 Captain E. C. Crockett, in the Harriet Lane. 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. 1, 1855. In May, 1856, the gold medal of the Royal Geographical Society was awarded to Dr. Kane for his distinguished services and important discoveries in the polar regions, and for his valuable memoir and charts.

In 1866 Dr. Kane published his Arctic Explorations: the Second Greenland Expedition of Sir John Franklin, in 1853-55, Philadelphia, 2 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, and was buried in his father's old home, at 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 1866.

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 States of Iowa and Missouri, and by the Indian Territory; on the south by the Rocky Mountains, and by the States of Kansas and Missouri; on the west by the Rocky Mountains; and on the east by the States of Kansas and Missouri.

KANSAS is the 26th state in the Union, and consists of an unclaimed 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 timbered. The centre of the Territory forms a portion 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 in the head region of the Rocky Mountains, and flows through the Territories of Kansas, Nebraska, Missouri, and Iowa.

KANSAS was formed from the western part of the Missouri, in 39° 56' 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., 99° 30' W. long. The united stream is known as the Kansas River. The navigable Kansas begins at the confluence of the Osage and Kaw rivers, in 39° 56' N. lat., 94° 32' 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 fords, for some hundred miles higher. Republican River, the principal tributary, 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 Nemahaw and the Independence. The Missouri itself forms the eastern boundary of Kansas, and affords an invaluable outlet for its products. The Kansas River, on the northern side of the Territory, is a very wide but shallow river, with a rapid current and a bed full of shifting sand-banks: it is navigable by steam-boats for about 50 miles. The great emigrant and freight routes to Oregon, Utah, and California lie across the Territory of Kansas, and follow the courses of the streams either as their affluents or their principal 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 sandstone. In the south-eastern corner of the country there are some portion of the basin of Upper Carboniferous Rocks, or Coal-Bed of the Indian Territory. The western and northern portions of Kansas seem to consist chiefly of strata of the Cretaceous group, but we have no detailed account of the rocks. The country, with the exception of the central waters, is very rough and hilly. The eastern portion is under a very hot climate, while almost every part is well watered. The prairies are of the best kind, but are deficient in timber. The river bottoms have a rich alluvial soil. The few settlers who have been established 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 Winfield Scott. The vast tract known as Nebraska, including an area of upwards of 136,000 square miles, of which Kansas forms the southern part, was a portion of the country purchased by the United States from the Republic of Mexico in 1848, and which has been held by the United States since that time. The region has been explored by several parties, but the discovery of coal and extensive tracts of prairie land, with the discovery of gold in the western part of the country, has attracted a great number of settlers. The region is now divided into several counties, and the population is rapidly increasing. The region of Kansas is largely agricultural, and its principal products are wheat, corn, and cotton. The region is also rich in minerals, and the discovery of gold and silver is a recent development.

The region of Kansas has been the scene of much controversy and conflict, particularly in the case of the Kansas-Nebraska Act of 1854. The region was originally part of the Mexican Cession, and was claimed by the United States under the terms of the Treaty of Guadalupe Hidalgo. However, the region was also claimed by Mexico, and the conflict between the two nations led to the Mexican-American War.

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(Arpa-Se), and the Marvysas (Tahina-Se), which last rises in a region called Idrissa by Herodotus (v. 118), and is skirted on its western side by the range of Laismus. Except the Calbis, which is rocky, and the Idrissa, which is pyramidal and rises to the south coast. The Seamander, which carries off the drainage of the greater part of Caria, flows in a west-south course, and in ancient times entered the sea to the north of Mount Phoinix, which is now filled up by the deposits of the river.

On the south coast, east of the Rhodian Chersonese and the lofty Mount Phoinix, was a land-locked bay, at the head of which stood the town of Phusys. There was a rock in this bay, near the eastern part of it, called Paneumus, which was also a Phocaean settlement. A small promontory, the head of the Bay of Panomus and the west of the Caib is a large lake six or eight miles across, and with a number of small streams running into it; a channel twelve miles in length connects it with the sea. Fellowes says its waters are brackish. All the southern coast of Caria eastward from Mount Phoinix, and extending to the mountains inland belonged to the Rhodians, and was called Peria. This district is very beautiful, and contains many fertile tracts. The irregular coast of Caria is most picturesque, indent or bordered with coves, bays, and inlets, where the land is well wooded, are in parts diversified by extensive ancient ruins, and belts by numerous islands.

Though Caria is extremely mountainous it contains some extensive plains. They are fertile, and form the chief homes of the people of Caria. A large one is known as the Aetas, in the valleys of the Seamander and its feeders. The mountains are in most parts well clothed with timber; furs, oaks, and plane trees being the prevailing species. The chief products are wheat, figs, olive oil, fruit of all kinds, and wine. The vine is trained to the highest trees. The wine of Cnidus was celebrated in ancient times. The palm-tree and the orange grow luxuriantly. Cattle are fed on the mountain pastures, and sheep are numerous; the green slopes along the valley of the Marvysas are covered with flocks, the climate owing to the invigorating effects of the sea being the mildest, the heat, while the high lands are cold, wintry, and snow-covered. At the source of the Meosynus the winteringers to March or April. The limestone which everywhere abounds affords excellent material for building. Among other mineral products Fellowes mentions iron-stone of great purity as abundant between Stratonicia and Myliasa, mica-schist, marble, &c. Warm springs abound, and there are gaseous flames.

The Carians maintained that they were an autochthonous people, and that their original home was the Carian peninsula. According to Cretan accounts they originally inhabited the Aegean islands, were subject to Minos, whose ships they manned, but they paid no tribute; and that driven from the island by the Cretans, they settled in Valaia, where they displaced the Leleges and Palaeagi. Homer mentions the Carians with the Leleges, Cacoones, and Palaeagi, among the auxiliaries of the Trojans; and they were probably all continental people and related to each other. The Cauniss, whose town Caunus was on the south coast, spoke a language akin to that of the Carians. Thucydides says that the early inhabitants of the Aegean islands were Carians and Phenicians, and that they were pirates. There seems little doubt from Thucydides (1, 5) that the Carians with some other people occupied the island of Delos at some early period. In Homer's time the Carians occupied Milearus, the banks of the Meander, and the heights of Mycale to the north of the river. The Ionian emigration drove the Carians from Mycale near which Priam was built, from Myras, and from the city of Milearus. The Doriens dispossessed them of Halicarnassus, Cnidos, the Triopian Chersonese, and probably from the island of Kos. The south coast was probably seized by the Rhodians about the same time. The Carians were driven into the Gulf of Cyme, but not all, for in the time of Xerxes the Carians furnished 70 ships to the Persian fleet, while the Dorian settlements supplied only 30 ships. North of the Meander and in the north of Caria were other Carian colonies, some in the interior, some between the Carians and their neighbours; but they maintained their language, and in the interior the population was pure Carian. They lived in small towns or villages, and formed a federation with common religious rites to Zeus Chryseus. The federation was called Chrysceus; its place of meeting for sacrifice and deliberation was the spot where the Macedonians after the time of Alexander founded Stratonicia.

Caria was included in the kingdom of Creusa, on whose defeat by Artaxerxes the Persians claimed title under the Persian domination. The Ionian revolt (a.c. 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 family of the name of Artaxerxes. Artaxerxes, who accompanied Xerxes to the battle of Salamis, with five ships, was one of these petty sovereigns. The Athenians afterwards made the inhabitants of the coast tributary, but the Carians of the interior maintained their independence. In the time of Alexander the strong towns of Alius appear, in consideration for which he restored them to the royal authority of which they had been deprived. Caria afterwards became successively subject to the Greek kings of Egypt and Syria. The Carian states having defeated Antigonus (a.c. 190) shared Caria between Eumenes king of Perga and the Rhodians, but left certain towns free. About a.c. 129 Caria was added to the Roman province of Asia. The Carians were a warlike people, not addicted to commerce like the Greeks; they hired themselves as mercenaries, and served under the kings of Egypt.

Among the towns of Caria were Cnidos and Halicarnassus, which were members of the Dorian hexapolis in Asia. Halicarnassus, or Doris, the capital, was founded in the 7th century B.C., and is the birthplace of Herodotus and Dionysius the historians. It was founded by a colony from Trozenes in Argolis, was the largest and strongest city in all Caria, and was the seaport of the Carian confederacy, the MESI home of Hestia. One of its rulers, Artemisia, wife and sister of Mausolus, erected in his honour 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 Mausoleum, are now in the British Museum. Halicarnassus continued to be a stronghold of Perga till the time of Alexander, who after a long siege burnt the city, but was unable to take the acropolis. Though afterwards rebuilt Halicarnassus never again became a power. Among the other towns were Alabanda, now supposed to be Arab-Hisra, on the Taphis, or Marvysas, where are remains of a theatre and other buildings; it was noted for its luxury; Cokseis, higher up the Marvysas, identified by Leake with the village of Taphis where Pococke found considerable remains; Labrando, to the south-west of Alabanda, famous for its Carian temple to Zeus Stratios, to which the Carians went in procession from Myliasa along the sacred road which was about 30 miles long (its precise course is unknown) which Fellowes erroneously takes for Labrando was Euromus, where are the remains of a beautiful Corinthian temple. Myliasa, in the interior and to the north of Halicarnassus, was the residence of the Carian kings from the ruins of the old town. There are still many beautiful remains of ancient architecture at Millassaa, which was visited by Fellows. East by south from Myliasa was Stratonicia, which was either founded or rebuilt on a spot called Idriss by a Macedonian colony after the time of Alexander. Stratonicia is identified by Fellowes with Esky-Hisra, which stands in a delightful country. There are remains of several temples, the marble walls of which are covered with inscriptions. The walls of the ancient town extend far beyond the line of Esky-Hisra.

Cumaus, the chief town of the Cauniss, was a place of considerable trade, on the south coast in the Rhodian Peraea. It was the birth-place of the painter Protopagenes, and famous for its figs. It was for a long time subject to the Rhodians. In the massacre of the Romans in Asia in the time of Mithridates Eupator, the Cauniss distinguished themselves by their ferocious cruelty to their victims. On a height above Caunus is said to be the tomb of Seus. Between Caunus and the Gulf of Glanuss was Calypsa, which has not been identified, but is supposed to be in the basin of the Talaman, or Dolonom-Chai, the Calbis of Siras and the lauds of Livy.

In the north-east of Caria, near the Phrygian frontier, is Asty, which is supposed to be Mycale, and Mesmore; its remains, which are described by Hamilton and Fellowes, consist of the massive walls of the acropolis and an inner castle, some subterranean buildings, a stadium, and a small theatre. South of Asty, on the right bank of the Mysus, stood the city of Aphrodisias, now Ghers, where are remains of a beauti-
tiful Ionic temple of Aphrodite, from whom the town was named. There was a city *Pamphile*, probably not far from Aphrodias. Fellowes ("Asia Minor") says that Ophria is the representative of the ancient town of Paphos, and that Mount Cadmus, near the confines of Caria, Lydia, and Phrygia, was famous for its hot springs on the banks of the Meander, by which its site has been identified. Hamilton's "Researches in Asia Minor; Dictionary of Greek and Roman Geography." 

North of the Meander were *Tripolis*, near the point where the river enters the plains (28° 1' N. lat.), where are remains of the ancient town, and the ruins of the ancient city of *Musauros*, west of Tripolis and north-east of the modern Nazeli, and near the modern village of *Mastaura*, has some ancient ruins, most of which are overgrown with underwood, and a fine spring of cold water: *Trudel*, situated on the plateau of *Musauros", below the modern Aïdin (a town of about 6000 houses); the plateau is covered with ruins, among which the Turks have quarried materials for the houses and walls of Aïdin; the most remarkable ruin is that of a palatial structure, which is probably not ancient: *Magnesia" farther west near the mouth of the Lethys in the Meander: and *Priene", on a rocky site near the modern town of Samos, where many ancient walls remain, and a theatre cut out of the rocky hill. Several of these towns were fortified by the ancient Greeks, and Lydus, in which later times they seem to have belonged.

Along the west coast beyond Halicarnassus were *Myndus", once the capital of Caria: *Corianda", a city which seems to have been an early centre of trade and commerce, which the main road of the two parts being united by a causeway (a now narrow sandy isthmus), alongside of which was the harbour which Leake takes to be that of Pasha-Limani: *Bargypia", on the southern shore of the lagoon of the Iassian Gulf, between Myndus and *Iassus", celebrated for its statues of Artemis Orithya; upon which, though exposed to the open sky, neither rain nor snow (it was said) ever fell. *Iassus", or *Iassos", now Askem, *Asyn Kales", on a small island at the head of the Iassian Gulf, which is formed of the same red volcanic colous as the town, contained considerable Christian and Mohammedan settlements in the lonic emigration under Neleus; 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. *Brachiside" was famous for its crag and temple of Apollo Didymus, of which there are still some remains; the temple was robbed and burnt by the Persians (s.c. 494), but it was afterwards rebuilt. A sacred way led from the sea to the temple bordered with monolithic statues seated on chairs. There was a modern "Imitation of the avenues of the temples of Egypt" (Leake, "Asia Minor"). *Branchide" near a harbour, called *Panormus", on the south of the *Poseidoneum*. *Miletus", one of the most ancient and flourishing towns of Caria and famous for its schools of oratory and philosophy, and for the numerous colonies founded by it on the Black Sea, was situated on high ground on the south bank of the Meander and near its mouth. Its citizens were great traders and powerful by sea. They carried on trade along the Lydian coast. It was subjected to the Persians by Cyrus the Great, and, notwithstanding internal dissensions continued prosperous until the Ionian revolt, instigated by its tyrant *Aristagoras*; this event brought down upon it the vengeance of the Persian, who utterly destroyed it (s.c. 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 prospous place under the Romans. Its site is marked by the modern "Miletus", where are seen the remains of an enormous theatre, an agorax, and a Christian church formed out of a Greek temple. South-east of Miletus, in the interior near the brackish lake of Bafli, which is probably part of the ancient Lake Mydonius, was *Heraclia" on the west end of Mount Lattara, where the ruins mark the spot. Near it was shown the cave of *Endymion". To the north end of this lake, near the Meander, was *Mydas"; and on the east side of Mount Lattara lay *Amusus", ruins of the city which is still a ruin. (Pococke; Leake, Asia Minor; Sir C. Fellowes, Asia Minor; Hamilton, Researches in Asia Minor; Dictionary of Greek and Roman Geography.)

K.B.S., a town in western Armenia, is situated in a high rugged country, and is about 60 miles from the level of the sea, on the Arpa, a feeder of the Araxes, about 100 miles straight-line distance N.E. from Erzerum, N.W. from

Baysand, and S.E. from Batum 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 Boghazkeui, and about 25 miles N. of Lake Urmia. It stands in a rocky amphitheatre of black basaltic hills, and has a dark dismal look, from the total absence of trees, and from the circumstance that all the houses are built of black basalt. It contains 1000 men and 1500 women, and is surrounded by a wall, the remnants of which are visible from its position on the boundary of Caria towards Phrygia (Kasim olep).
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 short stay at Covent Garden. He first appeared 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 Malcolm, in the opening of the new Haymarket Theatre. He afterwards acted at Drury Lane, Macbeth, Mrs. Siddons Lady Macbeth, and Mr. Palmer Macauley. He continued for a considerable time to play secondary characters, but gradually improved in his art. On the 20th of November, 1796, he performed George parchment, at Drury Lane, Mrs. Siddons taking the character of Millwood. In 1797 he was engaged at the Haymarket Theatre, where in 1800 he brought out his adaptation of Mercier's 'Deserter,' under the title of 'The Point of Honour,' which was performed successfully, and continued to be played in the theatre of the 2nd of July, 1806, he married Miss Marie Theresia 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 patronised and instructed by some ladies, and had become, when Charles Kemble married her, a favourite actress in the wolk of high comedy, and she so continued as Mrs. Charles Kemble. She was engaged to play the part of Lorenzo in 'Othello' on the 6th of 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 Schotland'; and in 1808, at the Haymarket Theatre, he played 'Monsieur Suzanne,' or '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. Meantime he continued to improve in his profession, took a wide range, and in some of his characters was without a rival. Among his best characters may be mentioned Orlando, Falcondridge, Cassio, Leon, Benedict, Young Mirabel, Mercutio, Petruchio, Archer, Rambert, and others in 'Elisabeth.' These characters 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 Shakspeare. 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 was born at London, on the 18th of November, 1814, aged seventy-nine 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, appeared on the stage, and was for some time separated. 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 act, young man; and I have seen your father, sir; and I have seen your grandfather, sir. Sir, he was a great actor.' Of the grandfathre there appears to be no record but the testimony of Macklin. The father, Roos KEMBLE, was born on the 1st of March, 1731, in the city of London, and was the author, actor, and manager of a company that performed in the principal towns of Wales and the west of England. He married in 1753 Sarah Ward, born September 2nd, 1735, at Clonmel in Ireland. She was also an actress. They had two sons, Charles and John. Their son, Charles, was the second eldest. [SIDDONS, MRS. SIDDONS, KEMBLE, JOHN PHILIP.] Charles Kemble was the 11th child and youngest son. Roger Kemble died in 1809, and Mrs. Sarah Kemble in 1806. STEPHEN KEMBLE (George Stephen Kemble), the third of the children, was born on the 3rd of May 1758, at Kington, 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 stock-practice in the country he made his first appearance in London, at Covent Garden, on the 24th of September, 1783. 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 Theatre. He first appeared in a part which he afterwards performed so remarkably 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 busy in person as to be almost unfit for any character in the repertoire but Prune in 'The Merchant of Venice.' He had a good voice and a good leg, and died on the 8th of June 1822, at the Grove, near Durham. FRANCES KEMBLE, the fourth child of Roger Kemble, was born on the 28th of December 1759, in the city of Hereford. She also became an actress, and performed in London; but having become infected with 'Inkle and Yarico,' a few days after which she was attacked by inflammation of the bowels, and died on the 6th of June 1822, at the Grove, near Durham. FRANCES KEMBLE, the fifth child of Roger Kemble, was born on the 2nd of April 1761, 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 Poria in 'The Merchant of Venice.' After repeating Poria she repeated the part of Prune in 'The Merchant of Venice.' She then retired from the stage. She had a good voice and a good leg. In face, figure, and voice she bore a striking resemblance to Mrs. Siddons. On the 21st of June 1785 she was married to Charles Edward Whitchot, an actor and joint-manager of a theatrical company in the north of England, known as the London and Provincial Company. Mr. Whitchot died in 1807, and the stage. Mr. Whitchot died about 1850. Mrs. Whitchot 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 a wit and a polemicist, was born at London, on the 12th of November, 1787, and was educated at Trinity College, Cambridge, where he took the degree of B.A. in 1803, and that of M.A. a year or two later. From the very first his studies were directed towards the Anglo-Saxon language; this was due to the influence of his father, and to his acquisitions 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 1802, 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 'Codex Diplomaticus Anglorum,' edited John M. Gathorne, vol. 1, 1830, 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 1847, and 'The Aneis of 843 as one of the works of the Society for the 'Dialogue of Solomon and Saturnus, with an Historical 'Introduction and English Translation,' published in 1848 by the same society, an edition of T. W. Tyndall's 'Considerations upon the Government of England,' published in 1849 by the Camden Society, 'History of the English Commonwealth till the period of the Norman Conquest," published in 2 vols. in 1849. This last work comprehends the main results of Mr. Kemble's Anglo-Saxon and historical studies. Mr. Kemble was editor of the 'British and Foreign Quarterly 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 Chancellor, his acting assistant in this office being Mr. Donne. Mr. Kemble was a Fellow of
various learned societies, including the Academies of Sciences of Berlin and Munich, and the Historical Societies of Stock- 
holm and Copenhagen. During the latter part of his life he was 
KENDIF, OR KENVIG. [GLAMORGANSHIRE.]
KENMAR, county of Kerry, Ireland, a market and 
and town, and the seat of a Poor-Law Union, is situated at 
the head of Kenmare Bay. The town occupies the site of an 
castle of the MacCarthy's, on the north side of the 
11° 52' N. lat., 9° 34' W. long, 16 miles 
S. by W. from Killarney, 163 miles S.W. from 
Dublin. In 1851 the population was 1501.
Kenmare Poor-Law Union contains 16 electoral divisions, with 
an area of 195 square miles, and a population in 1861 by 
railway enumeration was 10,483. This place was called Dunleary 
till September 3rd, 1821, when the name was changed to 
Kingstown to commemorate the embarkation of George IV. 
for England, which circumstance is recorded on a granite 
monument in the churchyard of the Protestant church. 
Aristocratic flocks of sheep in the immediate vicinity of this 
mere fishing village and collier haven till the new harbour-
works were commenced in 1817. Since then the town 
has been greatly extended, so that Kingstown may now be said 
to include not only Dunleary, but also Monkstown, Balloolock, 
and Dalkey. The harbour is formed by two piers inclosing 
an area of 250 acres, with a depth of from 16 to 27 feet, 
and approaching each other within a distance of 760 feet. 
The eastern pier, on the extremity of which there is a bright 
masted light, is 280 feet long; and along both piers there are quays 40 feet wide, 
which are protected from the sea by parapets 9 feet high.
The harbour has not proved so useful as was expected, 
or the number of vessels being much less than anticipated.
As number of vessels that entered Kingstown harbour in 
1851 was 3128, of the aggregate burden of 207,367 tons, exclusive 
of men-of-war, cruisers, and mail packets; of this number 1117 
were vessels trading to or from the port of Dublin. The 
chief exports are coal, salt, and vegetable oil, and the chief 
customs being paid by coal, iron, and timber. The beauty of the 
situation, the salubrity of the air, the picturesque country around 
the town, the arrival and departure of the steam-vessels, 
and the bustle connected with the shipping, have contributed to 
make Kingstown a place of great resort; it is also much fre-
quently as a watering-place. The principal street is George's 
street, extending above half a mile in length. There are 
numerous avenues, terraces, and parades, some of which are 
lined with magnificent trees, and the imperial avenue of 
the parish church, which is at Monkstown, there are a large 
and handsome Roman Catholic chapel, St. Mary's convent, 
a Free church, the Mariner's church, and places of worship 
for the several denominations. The terminus of the line 
from Dalkey, is in front of the harbour.
There are a petty sessions court-house, police and coast-
guard stations, a savings bank, lying-in hospital, dispensary, 
National and other schools, and commodious accommodations. 
The town is lighted with gas, and partially paved. The 
paving and lighting of the town is managed by a board of 15 
commissioners. There are remains of old castles at Monkstown 
and Balloolock, and of three in the village of Dalkey. King-
town is the station of the Royal St. George's Yacht Club.

KINGTON. [HEREFORDSHIRE.]

KINNIC or QUINIC ACID. [CHEMISTRY, S. 2.]

KIRBY, THE REV. WILLIAM, one of the most dis-
tinguished persons of his age, possessed a high knowledge of entomology. He was the grandson of John 
Kirby, a miller at Wickenham Market, in Suffolk, and 
the author of the 'Suffolk Traveller,' which was published in 
1765, and was a work of great repute in its day. Joshua 
Kirby, a brother of the father of the subject of our notice, 
was the friend of Gainsborough the artist, and distin-
guished as an architectural draughtsman, and the author of a 
work on Perspective. William Kirby, his father, was a 
clergyman, and writer of a well-receivedisValid, the midst of the elevated chalk downs, on the line of an 
anticlinal axis passed east and west. The anticlinal axis passes through the middle of a valley (hence called a 'valley of eleva-
tion,' or, more properly, an 'island' appears; and it might seem 
only on a view that the disconnection of hilly areas is simply 
owing to elevation and fracture, but by considering the 
areas and slopes of the strata, in plans and sections on a
where it appears he did not distinguish himself. From thence he was entered at Caius College, Cambridge. Here again he failed to distinguish himself, for Cambridge had at this time a great number of students. In 1742 he entered Ripley of Debenham. At this time he became acquainted with Dr. C. M. Swain, 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 pursuit of natural history, he determined to give up botany and decided, that he published very little on subjects 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, "I obtained a friend in 1838, observing accidentally one morning a very beautiful golden bug crossing the sill of a 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 these insects before, I was anxious to examine any other of its peculiarities, and finding that it had twostyles, I supposed that the captured animal was imprisoned in a bottle of gin, for the purpose, as I supposed, of killing it. 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 would be more spirituous to him. I then made a spirit of it, and hence commenced my further pursuit of this branch of natural history." These facts were communicated to Dr. Owyn of Ipswich, who was a good naturalist, and led him to recommend to his young friend the pursuit of entomology. So diligent was Kirby in the pursuit of his new science, that we find him warmly taking up the cause of natural history science, and becoming one of the first members of the Linnaean Society, founded by Sir James Edward Smith in 1787, being one of the original members of the Scientific Committee of the Linnaean 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 Cassida.' In the same volume is a letter to Mr. Marsham, 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 of practical value, and that it was important to study the insects which attacked wheat and other plants of importance to man. The last paper was followed by others on the Tipula Tritica, on Insects that prey upon Timber; and in the fifth volume of the Linnaean Transactions is a paper entitled 'Observations on the Lepidoptera' and a table of the nomenclature of the external parts of these insects. 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 Hemiptera, 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 1803, and was entitled Monographia Apum Anglie, or an attempt to divide into the natural genera and families such species of the Linnaean genus Apis as have been discovered in England, with descriptions and observations. This work embraced also general remarks on the class Hymenoptera, and a table of the nomenclature of the external parts of these insects. This work gave him a high position amongst the naturalists of Europe, and brought him into correspondence with Fabricius, Latreille, and other naturalists on the continent of Europe, as well as all the more eminent naturalists of his own country. It was followed by several papers, containing important additions to the 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 which he gave the name of "The Order of Stylus," to which these insects were 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. This work was written with Mr. Kirby's assistance, and was commenced in 1806, and resulted in Mr. Spence proposing in a letter dated November 23, 1808, that they should write in partnership a "popular Introduction to Entomology." This proposition was readily acceded to by Mr. Kirby, and in 1816 the first volume of the work appeared. It 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 1858. This work created a great deal of interest among the students of science and in the production of our language, and few scientific publications have been so extensively read. Since the death of Mr. Kirby, Mr. Spence has published a seventh edition, to which is added an appendix giving an account of the origin and history of the work. It is written in the form of letters, and gives in a familiar style an account of the structure, habits, and forms 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, localities, 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 so congenial to his spirit and inclination that he undertook it; and hence commenced all his natural history researches, that he at once consigned. The subject was the 'Habits and Instincts of Animals.' From his previous history it would appear that Mr. Kirby had not had such extensive opportunities of studying the other groups of animals so accurately as he had done insects. It is therefore, especially considering his age, not surprising to find that this work did not equal in merit his previous productions. It contains, however, a great number of interesting facts and observations, with abundant evidence, in reference to all departments of the animal kingdom, and the spirit in which it was written was eminently in accordance with the object of the founder of the treatises.

Mr. Kirby's other principal labours included the following:—A Description of several new species of Insects collected in New Holland by Robert Brown, Esq., F.R.S. ('Linn. Trans.' xii.); 'An Account of the Animals seen by the late Northern Expedition whilst within the Arctic Circle,' 4to, London, 1831, being the Report of the Polar Society, which attacked wheat and other plants of importance to man.

In 1834 a museum of Natural History was founded at Ipswich; he was present at the opening of this institution, and held the office of President till his death.

Mr. Kirby was twice married, his second wife being Miss Rodwell of Ipswich, to whom he was married in 1816. She died in 1844. He had no family by either wife, and died on the 4th of July, 1850, at the great age of 83 years. He was the author of 'A History of Life,' to which these insects were 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.

KIRKBY MOORSIDE. [ YORKSHIRE.]

KIRKBY STEPHEN. [ WELSHPOOL SHROPSHIRE.]

KIRKWALL. [ ORKNEY ISLANDS.]
Mr. Grove on an extensive tour to the East, during which he was to instruct Mr. Grove and Mr. Arstache, the Calmuck Tartars, the Caucausians, Armenia, Persia, and Baghdad. At this latter town he was detained during the plague. Mr. Grove lost his wife, and Kittie thence returned to England.

In July of that year, 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.’ Mr. Coates was an excellent writer, by himself, in which he proposed a plan of writing his travels, either in the form of weekly numbers, “like the ‘Penny Magazine,’” or as volumes of the ‘Library of Entertaining Knowledge.’ Mr. Coates referred him to Mr. John Knight, who had originated the ‘Poles,’ and who thought the society could not undertake the travels in the ‘Entertaining Knowledge.’ On the 19th he wrote to Mr. Knight, stating his willingness to use his journal for separate papers in the ‘Penny Magazine.’ On the 20th he called on Mr. Knight; the conversation was carried on by Mr. Kitto speaking, which he did very imperfectly, and Mr. Knight writing. A few letters afterwards passed, specimen articles were sent and approved of, and on the 4th of August he was engaged, at £30 per annum, on the same terms as a salary, saying that “the terms offered would be sufficient not only for my present but my prospective wants.” He continued for two years in various literary employments. In 1836 Mr. Knight formed the plan of printing the whole of Mr. Kitto’s journal, but when Mr. Kitto if he would like to furnish a few of them, illustrating particular passages from what he had observed in his travels. He not only eagerly embraced the proposal, but earnestly entreated to be allowed to undertake the responsibility of the entire work. A writer’s men prepared, and eventually it was approved of; the whole was then entrusted to him. The ‘Pictorial Bible’ was finished in 1838. During its progress, for about two years and a half, Mr. Kitto received an annual payment of £100, and an additional sum, which seemed to him a little fortune. In 1838 he embodied a great portion of his experience in Persia in two small volumes, ‘Uncle Oliver’s Travels.’ In 1839 and 1840 he was engaged in writing the ‘Pictorial History of Palestine,’ also for Mr. Knight. He was entitled to a new edition and he received for these and subsequent works, payments according to the highest scale of literary remuneration. From 1841 to 1843 he found employment with Mr. Fisher in the ‘History of Engravings,’ in 3 vols. In 1843 he wrote a ‘History of Palestine,’ published by A. and C. Black of Edinburgh; and ‘Thoughts among Flowers,’ published by the Religious Tract Society. In 1844 the degree of D.D. was bestowed upon him, and the University of Edinburgh presented him with a gold medal.

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In 1848 he had engaged on the manuscript account the ‘Journal of Sacred Literature,’ which was continued periodically under his editorship till 1853, but he says himself that it never produced him any profit. He also engaged in various other works, among the most considerable of which were ‘Daily Bible Illustrations,’ two series in seven volumes, of which the first series appeared in 1849–51, and the second in 1851–53. In February 1854 he was attacked by a paralytic stroke, from which he never completely recovered, and on January 4, 1855, he died at his residence at Balington, being unequal to his work, he returned to England in February 1855. In the following May he agreed to accompany Mr. Grove on an extensive tour to the East, during which he was to instruct Mr. Grove and Mr. Arstache, the Calmuck Tartars, the Caucausians, Armenia, Persia, and Baghdad. At this latter town he was detained during the plague. Mr. Grove lost his wife, and Kittie thence returned to England.

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whom he had a large family. She was a most effective assistant to him in his literary labours, and a sedulous promoter of his work in the editing, printing, and publication of his biography of her late husband, prepared by the Rev. J. E. Ryland, founded on materials left by himself either in the form of journals or of letters.

KLAGEFURT. [CLAGENFURT.]
KNOTTENSTEIN. [KNOTTENSTEIN.]
KNOT-GRASS. [POLYGONUM, S. 1.]
KOBELLITE. [MINERALS, S. 1.]

KOLLAR, JAN, a poet and preacher, the originator of the idea of the "Royal Union," or "Brotherhood of July 1789," according to Jungmann's "History of Bohemian Literature," was born at Mocowchow, in the county of Trenthachin in Hungary, being born a Slovak, or one of the Slovak race of northern Hungary, who speak a language akin to that of their neighbours, the Moravians, who, according to P. Junghans and Jena, he became in 1819 pastor of a Slovakian evangelical congregation at Pesti. In 1832 and 1827 he issued as two volumes, under the title of 'Narodnice Zpiselanky,' 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 Slavonic prose a medium so well adapted to the dignity of literary composition, he took for the language of his writings the Bohemian, though it was at the time rejected for German in Bohemia itself by several of the same authors. In 1821 at Prague he published a volume of "Elegies on the Bosom" ("Basom" ("Poems"); and in 1824 at Buda, a new edition, under the title of "Sawye Doera" ("The Daughter of Glory"), The copy of the second edition, in the British Museum, formerly belonged to Tattersall, to whom it was presented by Safarik, and who has written "This Hitherto remarkable book, and how its tree and fiery spirit should have burst this Austrian censorship is altogether unintelligible to J. B." The leading idea of the poems is that of the common bond of union between all the Slavonic nations, approached by a sequence not looked upon with favour by the Hungarians, who were anxious to see their Magyar language extended over the whole of Hungary, and observed with apprehension that the Slovians to the north of the kingdom, and the Slavonians to the south, were beginning to become conscious of their relationship. Kollar proceeded more and more to develop his idea in his "Slaeva Bohynie" ("The Goddess Sia or Glory"; a collection of philological and mythological studies, in a work in German, on the connection between the Slavonic and Latin dialects, "Ueber die literarische Wechselbeziehung zwischen den Stammen und Mundarten der slavischen Nation" (Pest, 1831). In this publication the wish for a general combination of the Slavonic races, for the sake of a great amalgam, was expressed than in any previous one.

The same idea pervades the "Cestepis" (Pesth, 1843), a record of a journey to Upper Italy, the Tyrol, and Bavaria, made by Kollar in 1841, chiefly for the purpose of discovering traces of Slavonic antiquity.

Among his other productions is a volume of sermons, "Kame" (Pesth, 1831), 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 Slavonic Congress at Prague by the cunning of Wende-schlagzelt. In the next year he was, probably by way of compensation, named professor of archaeology at the University of Vienna. In 1843 he made a journey to Mecklenburg, to study the ruins of the Obertors, and on his return to Vienna was surprised by death on the 29th of January 1852, when he was preparing for the press a German work, "Das slawische Altitalien," intended to prove the ancient inhabitants of Italy spoke a Slavonic language.

The work of Kollar which is chiefly admired by his admirers, is his "Slawy Doera," which in its latest shape, as it appears in his "Dils Benciaks" ("Poetical Works") published in 1827, comprises 940 stanzas, and extends to 638 sonnets, having little connexion except the common idea of the "Panalavism" which pervades them. Whatever the merit of some of the earlier portions, there is no doubt that some of the later editions are exactly calculated to awaken respect for the work; in particular some coarse attacks on Mr. Paget and Miss Paroos, apparently dictated by a feeling of resentment at their having spoken well of the Hungarians. The prose works of Kollar contain much information on the Saracens, and are disfigured by an occasional outbreak of the same spirit of mere Slavonic nationality. Several of Kollar's sonnets are translated in Sir John Bowring's work on the Bohemian poets.

KOLYFRIT. [MINERALS, S. 1.]
KOLN, or Cologne.

KONIYEH (Korneh, Koniah), a city in Asia Minor, capital of the pashalik of Karahan, which includes the greater part of Phrygia and Pamphylia, is situated in a wide plain in Lat. 38° 45' N, long. 32° 45' E, long. 305 miles E. by S. from Smyrna, and is 119 miles distant from the讥ithmetic 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, arches, and festoons, lion's heads at Pergamon, and in the north end. The walls rise from the brink of a wide fosse, and are pierced by handsome 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 heaps of 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 house of the pasha. The houses are low, and mostly built of sun-dried bricks, and stand on an old castle, which is in the centre of the town, is crumbling, the stone facing having been removed to build the pasha's konak. Konyeyeh contains many beautiful remains of Saracen architecture, among which may be mentioned the mosque of Sultan Nabiyl with its immense mihrab, and the Kremi Minaray Djamii (Mosque with the Minaret reaching to the Stars), which is exquisitely adorned with delicate tracery, fretwork, and mouldings. The minarets are chiefly of glazed tiles and bricks of various colours, red and blue prevailing. The old Turkish prison which forms part of the old castle 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 surrounded by walls approached by steps over an earthy ground, part of the site being now used as a cemetery. The other objects of note in the town are its large bazaars, several medressahs, 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 most interesting neighbourhood of the town is bordered by a broad belt of garden ground, with occasional groves of verdure by irrigation. The rest of the place in summer is a dusty desert; in winter flooded and impassable. The city is supplied with fruit and vegetables chiefly from the Greek village of Ziliach, which is two hours' distant, and situated on the way to the Saracen antiquity. This village is inhabited by about 5000 Greeks, descendants of the ancient inhabitants of Koneyh, who were driven out and obliged to settle here by the Turks when they captured the city.

Koneyh is the ancient Iconium, which Xenophon calls (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. Cicero spent ten days in Iconium on his way to Silicia ("Epist. ad Atticum," v. 30). 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 wrecked by them from first by the Saracens, and afterwards by the Seljuks Turks about a.d. 1075, who made it the capital of their dominions. Under the Seljuks, and during the period of the Crusades, Iconium acquired its greatest celebrity. The Seljuk dynasty was extinguished in 1354. After a 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 Koneyh declined rapidly. Ibrahim Pasha, commander of the Egyptian army, partly defeated the Turks near Koneyh, December 20, 1832.

A Christian synod held at Iconium about a.d. 330 pronounced against the validity of heretical baptism. Koneyh is looked upon by the Moslems as a sacred city; many diversions revolve in it, and it is visited by many pilgrims.
KOS

Greek and Roman Geography; London Geographical Journal, vols. viii. and x.; Conversations-Lexicon; L'Art de Vérisifier les Dates.

KOSTENDJE, or KÜSTENDJI, a sea-port town or rather village, in the Bessarabia, in Russia, is situated in the Dobrudjeha, at the eastern termination of the fortification called Trajan's Wall, 225 miles in a straight line nearly due north from Constantinople, and about 40 miles E. from Rassova. The town, which consists of about 500 houses, is built upon a bed of white limestone, on the summit of a large and singular projection of limestone 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 to vessels lying in from the wind. Kostendje occupies the site of an ancient town, Constantiniana, which is said to have been founded and named from Constantine the Great. It retains in its ruined mole traces of Roman masonry. The town has some trade in corn. The project of opening a channel for the Danube across the Dobrudjeha by the chain of lakes called the Kara—Su into the harbour of Kostendje has been often mooted. [Donatzschau, S. 2.]

KÖTEN. [Görmev.] KOZLOFF. [Aquia.] KRAIN, or CARNIOLA, a crownland of the Austrian empire, is bounded N. by Carnia, E. by Styria and Croatia, S. by Croatia and the Kistendar, and W. by Friuli and the circle of Görz. The area is 3858 square miles, and the population is estimated at 1,062,603. Kriš (4562 feet) is the highest peak.

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 Maksamov, and is separated from it by the valley of the Drava, 10,000 feet above the level of the sea. The northern boundary is formed by the offshoot or continuation of the Carnic Alps, which springs from the main chain near the village of Weisseneis in the north-western angle of the crownland, forming the watershed between the Drave and the Savar, and running in a general south-east direction between Carnithia and Carniols, through Croatia and Slavonia, where it terminates in the valley of the Danube. This range, which presents a very different appearance in its different parts, is studded with many isolated peaks, separated by basins, and divided by narrow ridges. It has a curious appearance to one who is not accustomed to the mountain scenery of the Alps. The sharp ridges and narrow valleys, the forests, and the great clefts and gorges, viewed from the middle of the basin, are so extraordinary and so grand that one is almost inclined to imagine oneself in some part of the Rocky Mountains or the Andes. The climate in the mountains and uplands is sharp; the summers are very warm; and snow disappears from the mountain tops only in the height of summer. The Bora, or north-east winds, at times sweeps the Karst and the more exposed parts of the country with furious violence. In the glacier and valley of the Savar, when the winter is over, the climate is much milder, and the vine, the chestnut, and maize flourish. Rye, barley, oats, some wheat, potatoes, pulse, flax, hops, and fruit are grown. In some parts the mountain slopes are clothed with pine, fir, and larch. The waters are of medium quality, and are thinned for the use of the smelting-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 boar, the somara, the somach, the mountain hare, the racoon, and the hare. 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 is iron, which is found in ironrich beds of various sizes, from microscopic to large blocks. The metals are iron, copper, zinc, lead, silver, and gold. The iron is found in gipsy deposits, and the copper in the mountains of Sorsa and Kranj. The iron is used in various forms, either as iron, copper, zinc, lead, silver, and gold. The iron is found in gipsy deposits, and the copper in the mountains of Sorsa and Kranj. The iron is used in various forms, either as iron, copper, zinc, lead, silver, and gold.
Adelberg under the name of Polk; this stream losses itself in the grotto of Adelberg and reappears in the Usn, which again sinks below the surface, but reappears at the village of Ober-Laybach, where it becomes navigable for boats. The remains of the Land of Carnikau, or Zirkuni, 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 Laybach, the capital of the crownland, is situated in 48° 54' N. and 14° 29' E., is about 36 miles 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 eight suburbs about 15,000 inhabitants. It is surrounded by the remains of ancient walls, churches, a lyceum, a gymnasium, and many other public institutions. The chief industrial products of Laybach are porcelain, linens, and refined sugar; there is an active transit-trade from the interior to Trieste, in which direction a 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, the residence of the prince, is celebrated for its beautiful scenery. Neumarkt, famous for the manufacture of syces, sickles, &c., none of these towns have so many as 2000 inhabitants.

Nestuditid, the capital of a circle, is beautifully situated on the river Gurk, 36 miles E.S.E. from Laybach. It is a very picturesque and pictoresque form. The town consists of between 400 and 500 houses, and has about 5000 inhabitants, who subsist partly by 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 office 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 757 steps cut in the lime-stone rock, which are kept in perfect order. The history of the mines is connected with the history of the town. In this stair-case there is a small at the churchyard where the miners perform their devotions before they proceed into the mine, and where a couple of tapers burning on the altar help to cheer the glooms that reigns in these subterranean caverns. The whole town is defended by a garrison of 400 musketeers and 150 dragoons 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 various exhalations of the quicksilver, which sensibly affect respiration, and the suffocating heat, soon make the visitor anxious to return to the light of day, to which he ascends by a perpendicular shaft in a kilometer which will not support the weight of a man. This is the last step from earth, at a great distance from the spot at which he entered. The greatest depth of the mine is 700 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 manufactory of cinnabar, which produces 1800 cwt. annually. In the vicinity there are marble, jasper, and freestone. All the establish here in the crownland, and there are various beneficent institutions for the poor miners, whose health is most dreadfully impaired by the deleterious atmosphere in which they ply their sily trade. These mines, the grottoes of Adelberg, and the Land of Carnikau, are the principal sources of the Carniola.

Carniola was, until the political arrangement of the Austrian empire in 1849, divided into the three circles of Laybach, Neustadid, and Adelberg, which corresponded with the older divisions of Upper, Lower, and Inner Carnia respectively, and formed the government of Laybach. Carnia was early inhabited by a people of Slavonic stock, and formed in the 10th century an independent margraviate, which at a later period the dukes of Austria and Carnia divided between them, and which was raised in the 12th century to a dukedom and the duchy of the Earl of Tyrol in 1335 fell to the Earl of Gurz, from whom it came, through failure of male issue, to the house of Austria in 1864. By the treaty of Vienna in 1810 Carnia was ceded to France, and in 1814 to Modena. In 1815 it again came into the possession of Austria, and formed part of the kingdom of Illyria. [ILLYRIA.]

Krasinski, Count Valerian, was a native of the ancient Polish province of White Russia, and was descended from a noble family. He 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 endeavours to promote instruction among them, and especially exerted himself in the establishment of a college at Warsaw for the education of such dissenters as were willing to pay the expense of valuable works, especially those on scientific subjects, he was the first to introduce stereotype printing into Poland, and this was not accomplished without a considerable outlay. In 1831 he published a number of pamphlets in Polish, while the revolutionary movement of 1830 had proclaimed the throne of Poland vacant, and organised a national government, with Prince Czartoryski as president, a diplomatic mission was sent to England, of which Count Valerian Krasinski was a member.

When the revolution began it seemed probable that the revolutionary movement of his countrymen, he was still in England, where he then became, with many others of his countrymen, a penniless exile. After having instructed himself in the English language, he attached himself to a merchant of some note who had a considerable number of valuable works. He resided in London during the first twenty years of his exile, and during the last five in Edinburgh, where he died December 22nd, 1855. He was a man of varied learning, and possessed extensive information, 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, 1839-40; 'Panaslawism and Germanism,' 12mo, London, 1848; 'Lectures on the Religious History of the Slavonic Nations,' 8vo, London, 1849; 'Sketch of the Religious History of the Serbs, Slovenes, Montenegrans, and the Slavonians in Turkey,' 8vo, Edinb. 1853; 'A Tractate 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 Churches,' 8vo, London, 1850. His works and pamphlets on recent political subjects, especially on those connected with the restoration of Poland. [MINERALOGY, S. I.]

Kugler, Franz Theodor, Professor of the History of Art in the Royal Academy, Berlin, was born on the 19th of January 1808, at Stettin in Pomerania. On the completion of his college studies Herr Kugler especially devoted his attention to the early history of painting and architecture, both in the different periods which produced the ancient arts, 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 drawing. His book 'The History of Painting from the Age of Constantine to the Present Time' appeared in 3 vols. in 1831. 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
England the translation appeared in parts, the 'Schools of Painting in Italy, translated by a Lady (Lady Eastlake), with the assistance of Mr. G. S. Scharf, and by B. B. Kugler, under the editorship of Sir Edmund Head. A second edition of the 'Handbuch' was issued in 1850, in which, with the assistance of Dr. B. Scharf, the work was brought to a greater extent remodelled, and a large amount of new materials embodied; and from this revised work a new edition of Sir Charles Eastlake's version of the 'Italian Schools' was published in 2 vols. 8vo, with additional notes and upwards of a hundred woodcuts, translated into English by A. Moriarty, under the title of 'History of Frederic the Great' (Lond. 1844); 'Beschreibung der Kunsthäuser von Berlin und Potsdam', a work of much more labour and research than its title would indicate; *Karl Friedrich Schinkel: eine Charakteristik seiner Kunstsammlungen* ('Schinkel: the Influence of his Theories of Art'), (Stuttg. 1842), a distinct work from the 'Handbuch der Geschichten der Malerei'. Both these works appeared at Stuttgart in 1848, where also was published (1845-62) a folio atlas of plates to illustrate his histories of art. For more than twenty years Dr. Kugler lectured in the University of Frederick William, as well as in the Royal Academy of Berlin; and also filled for some years an important position in the Ministry of Public Instruction. He died on March 16, 1868.

KUPPERSCHAUM. [MISCELLANY, S. 1.]

KUPPERSCHAUM. [MISCELLANY, S. 1.]

LABIUS, an island in the Malay Archipelago, and the seat of a British colonial government, is situated near the north-west coast of the island of Borneo, and 30 miles N. from the town of Borneo, in 6° 22' 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 1886 was 2,500. 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 point of the island. The mines have been taken by the Eastern Archipelago Company, who in 1850 exported 6092 tons of coal, of which 3090 were shipped to Dutch East India, and 3002 to British navy. During 1852 there entered inwards 1198 ships and prahus, of an aggregate burden of 8233 tons; and there cleared outwards 27, of an aggregate burden of 5069 tons. The imports in 1852 were valued at 30,970l.; the exports at 16,060l.; the principal exports were:—Coal, 6482l.; sugar, 2879l.; bird-nests, 1973l.; pearls, 1600l., and camphor, 1629l. 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 town he received his early education, and under the teacher, Konrad Heusinger, was first awakened his love for literature. For one session, in 1809, he attended the lectures of Hermann in the University of Leipzig, and pursued his studies in that of Göttingen, where, in conjunction with Dissen, Shultze, and Bunsen, he founded a philological society in 1811. While at Göttingen, Benecke lectured upon the old German literature, which probably directed Lachmann's attention more particularly towards it, and at a later period led to much valuable criticism upon and editions of many of the early German writers. During the short war occasioned by Bonaparte's return from Elba to France in 1815, Lachmann served as a volunteer in the Prussian army, but continued till the end of that year. In 1816 his edition of Prochorus, which was published at Göttingen, was published at Leipzig; and at Easter of that year he read his probational essay before the University of Berlin, the draft of which was presented to the Academy of Sciences under the title of 'History of Frederic the Great' (Lond. 1844); 'Beschreibung der Kunsthäuser von Berlin und Potsdam', a work of much more labour and research than its title would indicate; *Karl Friedrich Schinkel: eine Charakteristik seiner Kunstsammlungen* ('Schinkel: the Influence of his Theories of Art'), (Stuttg. 1842), a distinct work from the 'Handbuch der Geschichten der Malerei'. Both these works appeared at Stuttgart in 1848, where also was published (1845-62) a folio atlas of plates to illustrate his histories of art. For more than twenty years Dr. Kugler lectured in the University of Frederick William, as well as in the Royal Academy of Berlin; and also filled for some years an important position in the Ministry of Public Instruction. He died on March 16, 1868.

LADING, BILL OF. By the statute 16 & 19 Vict. c. 112 of 1843, the Act of Parliament, which previously passed only the property in the goods, now transfers all the rights of suit and all the liabilities of the original contractors.
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 dwindle in the upper classes, ought to be, and might be regenerated by the concentration of public opinion demanded, in this paper, the complete separation of the spiritual from the temporal power, insisting that political influence ought to be transferred to the multitude by means of its franchise, composed of its own body, yet, instead of a change in the style of eloquence, somewhat biblical in form, and of remarkable power, 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 16th of September 1833. Having been admitted to the Congregation of the Rota, he received a gracious letter of congratulation from the pontiff on the 29th of December. But in May 1834, the new champion of independence in church matters produced his most ambitious book, the‘Paroles d’un Croyant’, a pathetic lamentation, addressed alike to the suffering classes, and to the great and powerful; a work which rendered for ever the bond that united Lamennais to the see of Rome. Irritated by this new provocation, Gregory XVI, in a bull of 27th November 1834, attacked the book in very severe terms; whilst the revolutionary party applauded his advocate for his independent spirit and original powers of mind. This stigmatised by the Church, the Abbé was prosecuted for levelling accusations, and by the people hailed as an apostle, the Abbé Lamennais set out on his travels. He now produced in rapid succession: ‘Les Affaires de Rome’, in 1836; ‘Le Livre du Peuple’, in 1837; ‘Le Pays et le Gouvernement’, in 1840 (for which he was sentenced last and most earnestly ing), ‘Les lettres d’un citoyen’, in 1841; ‘Le Guide du Premier Age’, in 1844; ‘Une Voix de Prison’, in 1846; and ‘Les Conseils de l’Abbé Lamennais au Peuple’, in 1849. His most elaborate work, ‘Esquisse d’une Philosophie’, was published in 4 vols, 1840-44. He died February 17, 1854, unrecalled by his country, though during his last illness the most strenuous efforts were made to induce him to retract his heterodox opinions. By his express desire he was interred without any religious ceremony. It was one of his last and most earnest ingents, ‘to cast the papers, which contained his latest sentiments, should be published without alteration or suppression; but the religious advisers of his niece (who was also his housekeeper) so far wrought on her susceptibility as to cause her to refuse to give up the papers to the persons whom Lamennais had authorised to superintend their publication. The matter was in consequence brought before the proper legal tribunal, when the judges directed (August 1856) that the papers should be handed over for publication with their integrity. LAMPETER, Cardiganshire, a market-town, municipal and parliamentary borough, and the seat of a Poor-Law Union, in the parish of Lampeter-Port-Stephen, is situated in 52° 7’ N. lat., 4° 3’ W. long., distant 29 miles E. by N. from Cardigan, and 3 miles W. S. W. from Lampeter, the ancient seat of the Talley family, whose barons became privy councillors. In 1584 he visited Rome, met with the most flattering reception from Pope Leo XII, but declined the offer of the Cardinal’s hat, made to him by that pontiff. His next work, ‘La Religion considérée dans ses Rapports avec l’Ordre Général de l’Église Politique,’ began to exhibit that freedom of thought, reaching to the last boundary of revolution (but which, however, independent of church interests, abandons nothing in spiritual faith), for which he subsequently became so widely known. For this book he was summoned to appear before the Cour Correctionnelle, and condemned to a fine.

The general agitation and the ferment in the public mind, which preceded the fall of Charles X., had gradually produced a modification in the opinions of this enthusiast, whose faith was too sincere to be stagnant; the revolution of July induced him to adopt the principle of the people’s supremacy. Still he continued the same full believer, and earnest worshipper in the Church of England, and his last book is yet another volley of cannon-shot from the Roman Catholic Church. In attaching himself with equal warmth to the democratic principles, he pointed his objections at the temporal abuses of the Church; whilst his reverence for her spiritual authority remained unshaken. In September 1834, he was elected a member of the Church of London, in which several young men who had adopted his opinions, assisted him with their contributions. Among these were the Abbé Gerbet, the eloquent preacher Lacordaire, and M. de Moulême. The object of this journal was to spread


LADY-BIRD. [TRIMMEL.
LADY-FERN. [Aspidium, s. 1.]
LADY’S SLIPPER. [Cypripedium, s. 1.]
LADY’S SMOCK. [Cardamine, s. 1.]
LAMBORN. [Berkshire.
LAMENNAIS, FELICITE-ROBERT, ABBE DE, the son of a ship-owner of Saint-Malo, was born at that port, on the 14th of July 1787, the year of the universal jubilee. He was educated at the Congregational school at Saint-Malo, and then, at the age of 13 years old. In 1794, having been sent to live with an uncle, this relation not knowing what to do with a wildfowl boy, used to shut him up for whole days in a library, consisting of two compartments, one of which, called ‘Hell,’ contained a large number of prohibited books, which little Robert was enjoined not to read. But the lad already cared for none but books of reflection, and finding some of these on the prohibited shelves, that division became his favourite. Long hours were thus spent in reading the ardent pages of Rousseau, the theorist of man, and it was in this manner that his bent in sentiment and philosophy. Such a course of reading, far from producing its usual effects of precocious vanity and unbelief on so young a mind, served rather to ripen his judg-

LAMETE, a town and a market, in the county of Cardiganshire, and the diocese of St. David’s.

LAMPETER-PoRT-STEPHEN, a parish, in the union of Lampeter, in the hundred of Trefin Down, and in the county of Cardiganshire; 6 miles W. S. W. of Lampeter, and 4 miles N. E. of Cardigan. It contains 6235 acres, of which 1500 are arable, 3000 meadow and pasture, and 300 wood. The population is 1872. The living is a vicarage in the archdeaconry of Cardigan and diocese of St. David’s. The poor are served by a parochial school, with a master, and 20 pupils. There are 2 Poor Law unions, containing 2 parishes and townships, with an area of 74,200 acres, and a population of 1801 of 9883.

The town is pleasantly situated on the left bank of the river Teify, and 5 miles from the town of Lampeter-Port-Stephen. It was so called from the Teify Down. Besides the parish church, which was rebuilt in 1836, there are places of worship for Wesleyan and Calvinistic Methodists and Independents. A National school, and a Free Grammar school. An agricultural society has been established here. A county court is held. The market day is Wednesday, and there are 11 fairs in the course of the year. St. David’s College, Lampeter, founded in 1823 by Bishop Burgess, was incorporated in 1832, and received by a supplementary act of 1846, authorising the university to grant the degree of Bachelor in Divinity. The course of instruction is especially for Welsh students, but others are admitted. The college grants at the end of the term a certificate to students who have satisfactorily completed their theological course; at the end of three years the degree of Bachelor in Divinity. The course of instruction is especially for insiders, but others are admitted. About 30 scholarships and exhibitions are attached to the college, and it possesses a library of 30,000 volumes. The college buildings, erected in 1827 from a design by G. R. Cockell, R.A., stand on an
elevated site near the town, and form a quadrangle of a picturesque appearance: they accommodate about 70 students: the number of students in 1801 was 50. The annual income of the college is about 3000l.

LAMPRIS, a genus of Fishes belonging to the family Somersidae. It has an oval body greatly compressed; small mouth and rounded and pointed teeth. The dorsal fin of sides of the tail carinated; teeth wanting; branchiostegal rays 7.

L. guatatus, the Opah, or King-Fish, has been taken on this coast of the Bay of Biscay, is a rare fish, and as beautiful as rare. The upper part of the back and sides are of a rich green, reflecting both purple and gold in different lights, passing into yellowish-green below; above and beneath the lateral line are various round yellowish-white spots, from which the name of Opah is derived. Red, orange, and scarlet; all the fins bright vermilion. It has been remarked, on account of these showy colours, that the Opah looks like one of Neptune’s lords dressed for a court-day.

This fish was formerly called Z. Luna and Z. imperialis.

LANARK. [LANARKSHIRE.]

LANARKITE. [MINERALOGY. S. 1.]

LAND-CRAB. [OSCARINUS.]

Launceston, with its fine bridges, has been associated with the Royal Academy, was born in London in 1769. He learnt engraving under Byrne, a landscape-engraver of much ability; as early as 1793 he acquired some celebrity by engraving some vignettes, after Lutterbourg, for Maciule’s Bible; and increased his reputation by engraving the ‘History of England’ and ‘Moore’s Views in Scotland.’ Mr. Landseer also published an excellent series of engravings of animals from the works of Rubens, Snyders, Gillpin, and other eminent artists. Mr. Landseer delivered a course of lectures on engraving at the Royal Institution, which were published in the following year, and excited some discussion in the profession on account of some peculiar views promulgated in them. In the same year he was elected an Associate Engraver in the Royal Academy, and in 1800 a member; but the position assigned to engravers in the Academy—they not being admitted under any circumstances into full membership—was the source of considerable ill-feeling among engravers, and the post of associate engraver had been refused by several eminent engravers when Mr. Landseer accepted it. He announced however that he had only done so in the hope of being able to labour at a greater advantage in striving to remove the obnoxious restriction. Accordingly he memorialised the president and council on the subject, but after a year or two of correspondence and controversy the claim was rejected. Landseer’s mortification is said to have been so great as to have disgusted him in a great measure with his profession, and for some time after this he so appears, not from this time to have ever carved comparatively little. The literary taste however which lecturing and controversy had aroused, seems to have cultivated. Delighting in controv-

LANSINGBOROUGH. [LONGFORD.]

LANGHOLM. [DUMFRIESSHIRE.]

LANGPORT. [SOMERSETSHIRE.]

LANTERN-FLY. [FELIDONIA, S. 1.]

LANTHANIUM. [CHEMISTRY. S. 1.]

LARCENY. Petty larcenies may now be tried and summarily determined, with the consent of the accused person, by magistrates in petty sessions, the punishment in such cases being usually a fine, or, when the offender be a servant, a discharge, or, in cases of fraud or malicious injury, imprisonment not exceeding three months (10 & 11 Vict. c. 89; 19 & 11 Vict. c. 37; 18 & 19 Vict. c. 126). Persons confessing such offences may under the last named statute be similarly punished by the same tri-

LARIZZABALACEAE, Larrizabalaceous, a small natural order of Plants, containing 7 genera and 15 species. The species are twining smooth shrubs with alternate compound leaves, solitary or clustered; flowers coloured white, lilac, purple, or deep yellow, sometimes fragrant. The sepals of the male plant are 3 or 6 in 2 rows, deciduous; petals 6 in 3 rows Opposite the sepals, the inner ones smaller, or gland-like, or absent. Stamina 6, opposite the petals; filaments united into a tube, or even distinct; anthers turned outwards, rarely inwards, 2-celled, opening by a longitudinal slit. The female flowers as before, but larger, with 8 very imperfect stamens. Carpels distinct, or united, 3; ovary superior, 3-fruited, simple or single stigma. Two of the genera inhabit the cooler parts of South America; the remainder are from the temperate parts of China. Buranae is the only tropical form. These plants appear to be harmless. Some of them are eaten by the natives of Java.

LARKSPUR. [DELPHINIUM.]

LARNE, county of Antrim, Ireland, a sea-port town and the seat of a Poor-Law Union, is situated in a sheltered bay accessible by good roads and rail. It is distant 14 miles N.N.E. from Belfast, in 54° 50' N. lat., 6° 50' W. long. The population in 1851 was 2728, besides 846 in public institutions. The town is governed by nine commissioners. Larne Poor-Law Union comprises 13 electoral divisions, with an area of 37,721 acres, and a population of 34,710. The town originally sprang up under the protection of Oldrefter Castle, which was erected in the reign of Henry III., upon a little headland close to the town, where its ruins are still seen. In the older parts of the town the streets are narrow, crooked, and ill-paved, and the houses very inferior; the modern part consists chiefly of one long wide street of well-built houses. The places of worship are the parish church, three Presbyterian meeting-houses, a Roman Catholic chapel, and a Methodist chapel. Cotton-cloth, sail-cloth, ropes, and leather are manufactured; and there are several bleach-nills and flour-mills. The bay forms a good natural harbour for small vessels. Lime is exported in large quantities from the extensive lime-pits which are to be seen in the vicinity of the town. The other exports consist chiefly of provisions. Larne is now a mere out-port of Belfast. Fairs are held on July 31st and December 1st. The town has a dispensary and a petty sessions court.

LARNE. [MINERALOGY. S. 1.]

LAUDER, Berwickshire, Scotland, a royal and parlia-

LAUDER, Berwickshire, Scotland, a royal and parliamentary burgh in the parish of Lauder, is situated in 55° 42' N. lat., 2° 40' W. long., 264 miles S.E. from Edinburgh. The population of the burgh in 1851 was 1105. The town is governed by a chief magistracy and 17 councillors; and unites with North Berwick, Dunbar, Haddington, and Jedburgh in returning one member to the Imperial Parliament.

There is only one street in the town. The parish church, the town hall, and three taverns of the name of 'King,' are here. The Free church, and the United Presbyterian church are the public buildings. The burgh possesses an extensive common, which is exclusively used by a small body of privileged burgesses. Close by the town is the residence of the Earl of Lauderdale, Thirlestane Castle, which stands a mile from the town. The other public documents and other matters of importance are published in early life two novels, 'Lochandu,' and 'The Wofes of Badenoch.' His paper on 'The Parallel Roads of Glenroy,' which was read before the Royal Society of Edinburgh,
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. Launder published an Account of the Great Floods of August 1829, in the Province of Morys and the adjoining Districts, 5vo, Edinburgh. In 1837 he published 'Highland Rambles, with Long Tosses to shorten the Way,' 2 vols 8vo, Edinburgh, and in 1841 'Legendary Tales of the Highlands,' 3 vols. 12mo. He was long a member of the well-grounded, and a 'Memorial of the Royal Progress in Scotland' in 1844, 4to, Edinb., 1843. For the 'Edinburgh Tales,' conducted by Mrs. Johnstone, 3 vols. Edinb., 1845-46, he wrote the story of 'Farquharson of Inverey,' and 'Donald Lamont, the Braemar Tartar.' He was Fellow of the University of Oxford, and had issue two sons and seven daughters. He died May 29, 1848, at his residence, the Grange, near Edinburgh, and was succeeded by his son, Sir John Dick Lauder, who was born in 1813, and married in 1845. Sir T. D. Lauder was deputy lieutenant of the counties of Haddington and Elgin, and a Fellow of the Royal Society.

LAUREL. [Laurum.] LAURIC or LAUROUS ACID. [Chemistry, S. 2.]

LAVENDULA. [Mineralogy, S. 1.]

LAVENHAM. [Suffolk.]

LAW, CRIMINAL. Upwards of 65,000l. has been spent on various commissions, which have been issued during the last year, in the consolidation or codification of the criminal law; but this work has not been attempted, nor have any 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 whole system. One of two points only need be referred to. The summary jurisdiction recently conferred on magistrates in petty sessions is noticed under Launcy, S. 2.; the liability of trustees to prosecution for breach of trust is of late common, and the measures that are effectuated in the course 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 punishment to be ordered by the court has been abolished by the statute 30 & 31 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 confined at the expense of the country.

LAW, EDWARD. [Elenborough, Lord, S. 2.]

LAYBACH. [Krain, S. 2.]

LEASE. The lease for a year [Lease and Release, 'Suffolk,' xxviii. (1878), 378] is the wager of a man conversing, a statutory recital in the lease coming in place of it. (4 & 5 Vict. c. 91.) LEATHERHEAD. [Surrey.]

LECANORIC ACID. [Chemistry, S. 2.]

LECHLAD. [Gloucestershire.]

LEE, REV. SAMUEL, D.D., was born May 14, 1783, at Longnor, a village in Shropshire, about eighteen miles from Shrewsbury. He received the rudiments of education at a chartered school in that village, where at the age of twelve years he was apprenticed to a carpenter and joiner. 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 by the end 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-first year, his reputation in Westminster was so great as to cause on the part of his employer the repairing of a large 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 Coxe had forgotten him, and the Rev. Mr. Lockett lent him books, and assisted him in pronunciation. 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 Bowerion'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 1816 took his degree of B.A. Having received ordination, he preached in the Church Missionary Society 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, and in 1820 he was at Cambridge the time requisite for taking his d-gree of M.A. (which was necessary before he took the chair), a grace passed the senate to request the Prince-Regent to grant a mandamus, which was obtained accordingly. In 1829 the Professorship of Arabic, one of the six chairs, was abolished, and Mr. Lee was appointed to the chair by the King in Council. He was re-elected in 1833, and in 1834 took 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 Howarrogate. He took the degree of D.D. in 1827, and in 1831 was elected Regius Professor of Hebrew to the University of Cambridge, and with it obtained the accompanying 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 9th of December, 1859, at Barley rectory. He was twice married. Among the more important of Dr. Lee's works are the following:—'Hebrew Grammar,' 1830; 'Travels of Juba. Translated from the Arabic,' 1830; 'The Book of Job, translated from the Hebrew, with an Enquiry into the Nature, Progress, and End of Prophecy,' 1840; 'An Inquiry into the Nature, Progress, and End of Prophecy,' 5vo, Cambridge, 1849; 'The Events and Times of the Visions of Daniel and Ezekiel,' 1847. Dr. Lee, John, in 'The Hermit's Tale,' a poem; in 1796 'Almeyda, Queen of Granada,' a tragedy, which was successfully performed, Mrs. Siddons sustaining the principal character. In 1804 was published in six volumes, a novel entitled 'The Life of a Lover,' which is said to have been her earliest production, 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 'Aspinwall,' which was condemned at Covent Garden. In 1805 she produced 'The Veil.' Her chief claim to notice, like that of her sister, rests on 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 1795, when 'The Erroneous Lady's Tale' was published; this was followed in 1787 by a comedy, 'The New Peegree; or, Our Eyes may deceive us,' 'Clara Lennox,' a novel in two volumes, in 1797, and 'The Mysterious Marriage, or the Heirship of Rosalia,' a play, in 1798; all of which were forgotten at Covent Garden. In 1799 appeared her most successful novels, the first two volumes, the fifth and last in 1805; they were so immediately popular that second editions of the first two volumes were published in 1799. They consist of twelve tales, of which one, 'The German Tale—Krutirms,' furnished Lord Byron with the theme and some of
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an al 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 fins indistinctly cleft. The body is elongated, the females are much more so than the males, the males contain the most definitely drawn characters, and a well-developed plug. Several of the other tales however show a considerable knowledge of the human mind, are unexceptionable in their reasoning, and are narrated in a simple and unaffected style.

LEERSIA, a genus of Grasses belonging to the tribe 

Oryzae. It has 2 pale compressed, keeled, and awnsless, the lower one much broader; stigmas protruding from the side of the pale, enclosed in the pale.

L. orizoides has a patent pale with many branches, spikelets triandrous, half oval, ciliated on the back. It is a creeping plant with a stem one to two feet high, never proembolus, and rooting at the joints. The leaves are broad and long-edge, with a yellowish, almost horizontal pale, in a tuft; pale rachis with a glaucous chin; pale, rarely, if ever, protruding in this country, mostly inclosed in the sheath of the uppermost leaf. It is found in marshy ditches in Sussex and Hampshire.

LEWIS, B.A. LEWIS, C.R. LEICETER, S. C. R. LEOCOATOM [Ceroloxa, s. 3.]

LEIXLIP, county of Kildare, Ireland, a small town finely situated at the junction of the Evey with the Liffey; 11 miles W. from Dublin, by road and railway from Dublin to Galway; part of the great route of Liffey and Bridgend. The parish church is in the pointed gothic style. The Roman Catholites have a chapel. The Liffey is here crossed by a bridge. Above the town is Leixlip, castle, built by Adam de Hereford, one of the Strangews's followers. A little way beyond the castle is the Liffey, a fine cascade, called the Salmon Leap. The town is a place of resort on account of the beautiful scenery near it. Fairs are held in May, July, and October.

LENEX, 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 Baire, an eminent architectural engraver, and remained with him four years. Le Keux formed for himself, however, 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 was here seen, that the 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 constant and discriminating eye for the beauties both of the form and the details of gothic architecture, and consequently 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 born. 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 Cathedral Antiquities," and other of Mr. Britton's works; the elder Puqis's "Architectural Antiquities of Normandy," "Gothic Examples," and "Gothic Specimens;" and "Neale's Westminster Abbey," and "Churches (vol. 1.);" "The Oxford Almanac;" 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 size with somewhat less freedom than the larger works. Mr. Le Keux died April 2, 1846. His eldest son, J. H. Le Keux, has a high reputation as an architectural engraver.

LEMA. LEV. LENZINITE [Minerology.] S. 1.


LEPIDOGASTRIDE, a genus of fishes belonging to the Superfamily Gobiidae, and to the family Cyclopteridae, or Discobolidae. [Discobolus, s. 1.] The genus Lepidogaster, 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 fins indistinctly cleft. The body is elongated, the females are much more so than the males, the males contains the most definitely drawn characters, and a well-developed plug. Several of the other tales however show a considerable knowledge of the human mind, are unexceptionable in their reasoning, and are narrated in a simple and unaffected style.

L. cornubianus, the Cornish Sucker, Juria Sucker, and Ocellated Sucker, Cyclopterus Lepidogaster of Pennant and C. Brandt's Abalone of Pantin are occasionally met with off the coasts, and has been taken on the coasts of Antrim and Clare in Ireland. This fish is small, a specimen described by Mr. Couch not being more than two inches and a half in length. It adheres with its sucker to almost any substance presented to it, and even to the human palpe. The general tint of the fish is a pale flesh-colour, with spots and patches of carminie about the upper and under surface of the jaws, around the eyes, on the top of the head, sides of the body, and abdomen.

L. bicarinatus, the Bicarinated Sucker, is a second 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 to an inch in length. Its general colour is a very minute red; pale flesh-colour underneath, with a light-coloured patch between the eyes, and otherwise liable 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.

LEPIDOLOTHUS, a genus of Fishes belonging to the family Gadidae. It is closely related to the genus Mennis, to which the Common Cod belongs. The subfuscus are united with the nasal bone, and form a depressed muzzle, the latter narrowed above and below. The head and body have hard spines; the ventra are a little on the throat; the pectoral of less size; the first dorsal high; the second dorsal, anal, and caudal united; the jaws short; the teeth fine and short. The species inhabits deep water, and is not seen except when taken out of the water. Two species are known. They inhabit the Mediterranean and Atlantic.

LEPIDOLITE. [Mica, s. 2.]

LEPIODOTILE. [Mica, s. 2.]

LEPIODOTILUS. Detached, detached cones which are scattered through the various strata of the Coal Formation have been thus named. They are obviously organs of fructification, and have therefore belonged to some of the arborescent plants whose remains they accompany, a group of them as are preserved in the nodules of iron-stone, or are otherwise mineralised without pressure, alone offer the means of ascertaining to what existing families of plants they are most nearly allied; for in those that are crushed flat in the shale the remains of the plant are necessarily lost. This fact has led to the better-preserved specimens having been sliced, polished, and examined with the greatest care; but this expensive operation has hitherto thrown little light upon the true nature of the object. It has been suggested by the late Mr. Banks that certain conditions necessary for their complete illustration have never been di-played by one specimen, but the most important point, the nature of the organs of fructification, has hitherto wholly escaped observation in all. Every one being as an aggregate of organs of some kind, is necessarily to ascertain, not only the arrangement of these organs, but the nature of the tissues composing them, and their contents, before satisfactory conclusions can be drawn as to their relationship to any of the vegetable remains they accompany, or to whatever existing order of plants they are allied. The three necessary conditions are these:—

1. The arrangement of the individual organs of fructification, of which the cone is an aggregation, and the nature of the scales supporting them. These are characters sometimes displayed on the fracture of the specimen by ordinary means, though rarely, from the parts appearing to have suffered partial decay previous to or during petrifaction. The imbricating apices of the scales, which lie over one another like the petals of a pincushion, usually removed with the matrix whereas the fossil is embedded.

2. The tissues, or anatomical structure of the various organs composing the cone: namely, of the central axis, which is a central cylinder of the same form as the cone, and a narrow ring of the tube being inserted into the axis support the individual male or female organs; and of the latter themselves. These tissues can only be displayed by slicing fossils in the very best state of preservation, and in such as are changed into a more or less transparent mineral. Specimens of this description are exceedingly rare.
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 organs 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 must regard the materials as secondary fragments. But including these various objects are clusters of flowers or fruits, or are the spore-bearing organs of flowerless vegetables, as mentioned above.

Several species of Lepidostrobi are mostly found in seams or 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 iron-stone, and are therefore separately preserved; all in which the spores are preserved, have occurred as broken frustules within stems of Lepidodendron elegans and other species of that genus. Usually the fragments of Lepidostrobi are not more than half an inch long, and very frequently are mere discs; so that though there is often the appearance of several inches long, and traversing the whole length of the fragment of Lepidodendron, it will generally be found that this is owing to being placed each at an extremity of the truncheon, and opposite to one another. [See Figure, Lepidodendron.]

The absence of the fruit is, indeed, doubted, for no modern cone of any natural order could be broken up into the shallow discs which many of these fossils present. It is difficult to account for the presence of these fragments of Lepidodendron, unless we can but conjecture that the trunks of the latter were erect stumps, whose interior was hollowed out by decay—that these stumps were covered with water in which were fragments of Lepidostrobi and other vegetable matter, which were thus washed 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 cavities as fern fronds find their way into the axis of Sigillaria. When the stumps were preserved, and the 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 trunk; and the latter would certainly have been materially compressed had they received on one side the pressure of the superincumbent shales.

2. Any stumps which might have been submerged and the fragments of the cones carried away from the water. Had the cones fallen from an overhanging forest they would have alighted in all manner of irregular positions, and in some cases overlain one another, which is never the case.

3. The deposition of the cone fragments is effected by the great rapidity of the water, and not by a sudden rush or current. This again is proved 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 produced a deep ravine, and the Lepidostrobi 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 descending stumps would be prepared to incline other Lepidostrobi on the precipitation of the next similar torrent.

The extreme fragility of the Lepidostrobi displayed by these specimens is very satisfactory, as the Lepidodendron, which supplies the characteristic of this, which is eminently favourable to a rapid decomposition 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 matter, such as occurs in another; the 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 more singular from their 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 material resting on the stumps about through which they root into; whilst the fossil Lepidodendron of the clay-iron-stone seams is of the same mineral as that wherein it is embedded. Were the fragments of Lepidostrobi washed into their inclining stumps by any current, that agent would in all probability have transported the remains of 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 circumference 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 Lepidodendron bark fossilised without pressure, and imbedded within the stem along with the Lepidostrobi.

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 the Lepidodendron. The fragments of Lepidostrobi, and the arrangement of the tissues in the axis of the cone entirely accords with that of the stem of Lepidodendron. Just as we find in modern Cycadaceae the temporary closure or extinction of the apical continuation of the branch, which bears leaves modified into organs adapted to support and protect the parts of fructification. The most positive evidence that can be adduced of Lepidostrobi belonging to a genus allied to Lycopodiaceae, and is afforded by the spores, the presence of which not only removes them from Cycadea, Conifera, or any other order of flowering plants, but directly refers them to the family of Lycopodiaceae. It is well known to botanists not only that these are far more peculiar to one natural order of plants, but that the spore diagram is no indicator of their contents or 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, states the probability of their being referrible either to Coniferae, Lycopodiaceae, or more probably still to Cycadea. Dr. Hooker, after describing the nature of spurious cones which have no relation to the reproductive organs of the plant, as in the common cone-bearing willow, wherein the cone is produced by the bud of an insect, 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 Lepidostrobi may be of this nature; witness the fact of wind-blown sandstone indicating whether it be a Lepidodendron or the apex of a branch crowded with short leaves. Were the Fuegan plant to occur in a fossil state the probability is, that its cones would be regarded as undoubted reproductive organs, and the plants themselves be referred to Conifera."


LEPTURUS, a genus of Grasses having solitary spikelets, imbedded alternately on opposite sides of the rachis of 1 inch in length, and a superior rudiment. The rachis is long, rough, cartilaginous, covering the flower. Fleshy scarios. Stigma feathery.

L. incurvatus has a cylindrical subulate spike; 2 glumes equaling or slightly longer than the lemma; stem from 2 inches to 6 inches in length; curved when dry; a variety of this species, L. fitiformis, the spikes are much more slender, filiform, scarcely at all curved. It grows in sandy salt-marshes.

[LENI.E. THE NORTHERN CRISTAGRAMA.] The following is Dr. Baird's arrangement of the British species of the Lernaeodae, or Lernaeas:

Tribe I. Anchoritaceae. 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

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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 claws, 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; antennae short, and rather broad; neck narrow, short. Thorax carrying on the under surface 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 others, and bearing the oviferous sacs; the upper, and 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.—Lernomena.

Foot-jaws and thoracic appendages as in Chondracanthus. Oviferous tubes long, either club-shaped and stout or slender and twining.

1. L. cornuta. Female.—Head oval, rather elongated; antennae 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 middle 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 digits, at a slight distance from each other and from the side of the body. The oviferous sacs are of considerable size, cylindrical, and about two-thirds the length of the body. Length nearly 3 lines.

Male.—Somewhat pyriform in shape. Head very large, swollen. Thorax conical, divided into five segments, and terminated by a rudimentary abdomen armed with two small hooks. Antennae slender, setaceous, projecting from the anterior extremity of the head, and under-rath them a pair of bare and quite slender appendages, which are provided with mandibles; and 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 attached to the branch of a sole.

2. L. cincta. 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 antennae exhibits on each side a round lobe or tubercle. The antennae 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 horn-like appendages, divided into three digitations; and on the lower half there are three smaller appendages, but simple, 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 blunt 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 (Lernomena) cornuta.

It is found attached to the branch of the Triples.

3. L. Lophii. Female.—Body rather elongated, and somewhat gibbous. Head small, having on each side a small horn-shaped appendage directed a little obliquely backwards. Antennae 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 the longest, and having on the under margin 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 horse 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 part of the body, arms very slender, and twisted. Length, 69 lines; breadth 21 lines.

The male is very similar to that of the Chondracanthus cornutus already described.

It is found on the Lophius piscatorius, in the pouches.

Tribe II.—Anchoracarpaceae.

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, and terminate there in a rounded 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.

Males in general differ very much in appearance from the females, being generally smaller and unattached.

Family 1.—Lernoepodada.

Arm-shaped appendages long, wide apart from each other at their base, and united only at the tip.

Genus Lernoepoda.

Female.—Body generally elongated, oval. Head short and thick. Two pairs of foot-jaws, well-developed, and placed near each other. External ovaries of moderate length and breadth.

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 hurry texture, ovate, depressed, broad at the base, and obtuse pointed in front, 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. A somewhat club-shaped form, and gives 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 them lie the ovaries, which are about the length of the entire body, thick, straight, and cylindrical.

Length of the whole animal nearly 8 inches. Head, one line and three-quarters. Body, 74 lines. Arms, one inch and one line. Ovaries, one inch and one line and a half. Male.

A specimen of this arctic species was found attached to the eye of a shark caught on the English coast, 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 nearly as large as that of a large的程度。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 in length of the body. Length of the whole body, including arms, about three-fourths of an inch.

Male.—Body divided into two portions, of an ovoid form, and about equal size; the upper half represents the head, and carries a pair of antennae, and two pairs of foot-jaws of 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.

It was found attached to the cavity posterior to the vent of the Syngalus galeus.

3. L. Salmoena. 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 bulging 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 terminates at the posterior end of the two minute eminences. The oviparous 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.—Anchorellidae.

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. Oviparous tubes of moderate length, and cylindrical.

The male differs in appearance very much from the female, and is very small.

1. A. uncinata. Female.—The body of the animal is thick, oblong, 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 oviparous 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 of 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 hook-d-claw-like members. Length, one-fourth of a line.

The female fixes itself to the fins and gill-covers 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 celarius.

Tribe III.—Anchorellinae.

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. 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.—Penioida.

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. sprattus, the Eye-Sucker. Body slender, considerably larger at the posterior extremity than at the anterior. Head 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 a dozen constrictions, which make 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 constrictions very distinct. Length about 14 in. W. long, and obliquely truncate. The oviparous 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. annulata. 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, horrid colour.

The abdomen is like that of the preceding, and the oviparous 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 encaeuscola and C. sprattus.

Family II.—Lernoceridae.

No vestiges of feet on under surface of body, nor any appendages representing them.

Genus I.—Lernocera.

Body long and slender; head furnished with horn-shaped appendages, which are simple and symmetrical in form. Oviferous tubes straight, and of moderate length. Abdomen very small.

1. L. opercunae. 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.—Lernus.

Body more or less twisted, and outre in appearance. Head furnished with horn-shaped appendages, which are irregularly branched. Oviferous tubes twisted into round masses, and placed under the posterior portion of the body. Abdomen of considerable size.

The genus Lernus is now restricted within very small limits. Established by Linnaeus upon the L. branchialis, it is at the present day confined to that species and one or two others.

1. L. branchialis. 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 a letter T. The abdomen is of considerable size. The oviparous tubes are slender and very much twisted.

The whole animal is about an inch in length, and is of a very firm consistence, being both hard and horny.

It is found on the gills of the Cod. (Baird, History of British Entomostroæ; Milne-Edwards, Histoire Naturelle des Crustacés.)

L. LETWICK. [Scole.]

LETTERKENNY, County of Donegal, Ireland, a market and post-town, and the seat of a Poor-Law Union, is situated on the side of a steep hill above the left bank of the Swilly, at about a mile above its entrance into Lough Swilly, in 54° 6' N. lat., 7° 45' W. long, 15 miles N. W. from Lisfard, 140 miles N. N.W. from Dublin. In 1851 the population was 1047, besides 233 inmates of the workhouse. The Poor-Law Union contains 14 electoral divisions, with an area of
101,507 acres and a population of 29,665 in 1861. The town of Letterkeny consists principally of one long straggling street, which however contains some good retail shops. The chief buildings are the parish church, a Roman Catholic chapel, an army depot, a post-office, a druggist's shop, a general store, a hotel, a masonic hall, a foreign mission station, and a school. The community is supplied with water from a spring about half a mile from the town, and admits vessels of 150 tons. The exports are chiefly corn, butter, cheese, and hides; the imports consist of colonial produce, manufactured goods, iron, coal, oak, bark, fish, etc. The scene of the Liven-Swilly above Letterkeny, and of Conaught and Sligo below, is as picturesque as any in the province.

LEUCHTENBERGITE. [Mineralogy, S. 1.]

LEUCIC ACID. [Chemistry, S. 2.]

LEUCINE. [Chemistry, S. 2.]

LEUCOJUM, a genus of Plants belonging to the natural order Amyllidaceae. It has a 6-parted perianth, bell-shaped; the segments are equal, and thickened at their points; the stamens are 3.

L. caeruleum, the Summer Snow-Flake, has a many-flowered spathe; a style thickened upwards. The height is from 2 to 3 feet. The flowers are white and drooping; the tips greenish. Leaves broadly linear, keeled; scape 2-edged; spathe usually as long as the flowers. It is found in wet woods, especially by streams.

LEUCOLINE. [Chemistry, S. 2.]

LEUCOPHANE. [Mineralogy, S. 1.]

LEYBURN, or LYE BURN. [Yorkshire.]

LIBERIA, Republic of, occupies a considerable extent of the west coast of Africa, and was formed into an independent state by an act of the United States—which declared itself an independent state, and carried in the affirmative.

The English government, which had displayed the friendliest feeling and rendered important assistance to the infant community, announced that it could not recognise the right of the Liberian authorities—the colony being neither an independent state nor an acknowledged dependency of the United States—to impose duties on goods imported into the country by British subjects. The Liberian council forwarded a resolution admitting that the time had come for the independence of Liberia to take into their own hands the whole work of self-government, including the management of all their foreign relations. According to this question was put to the assembled people whether they would declare 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 hoisted in the 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 independence, and has since been recognised by France, Prussia, Brazil, and some other powers, but not by the United States.

Liberia has a general direction north-west and south-east, and is broken by several inlets and coves, of which those formed by Cape Mount, Cape Mesurado, and Bassa Cove are of much value as harbours. The greater part of the coast is low and sandy, or marshy; but Cape Mesurado has a range of water from 30 miles to the shore; and the shore is considerably elevated. Between those 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 bold and rocky, and there are a number of cliffs in many places by which the sea is dashed against their bases. The sea is on the whole calm, 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 every thing is covered with thin layers of low sandy beach, in many places bordered by sand-banks: so that nearly all along the coast it is necessary for the mariner to keep a sharp look out. 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 grass, and far to the interior of the low country, with forests, rising farther inland into mountain ridges, and divided by wide and fertile valleys. The rivers are numerous, and some of them are good-sized streams; but all have their mouths obstructed, and some entirely closed, and the mountains obstructing the way to the sea do not 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 vessels to pass through. It is 60 or 80 miles in water the whole distance. Cape Mesurado is 30 mile wide 40 miles from its mouth, has a considerable 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 only ascend it for about 35 miles. The other most important streams are the St. John, which falls into the sea at Bassa Cove; the Jambu, which lies between the St. Paul and St. John, and has a very considerable fall; the Narraga, which falls into the main river at its mouth; and the Monrovia, which rises to the north of the town of Monrovia, which falls into the sea by Cape Mount, and has its entrance almost closed by a narrow spit of sand; the Grand Cestos, some distance eastward; and the Doro, still farther east, which has about 6 feet of water over its bar, descending inside to 4 fathoms at flood.

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; and by the high temperatures of the interior, which visit all the newly-arrived alike, but is now comparatively seldom fatal in its attacks. Nothing like an epidemic has ever appeared in Liberia.

Lib. folio 358
Librarians to the Free Colored People of the United States" 1847, may serve, with allowance for a little heightening of the character and capabilities of the country:—

"A more fertile soil, and a more productive country, so far as it is cultivated, there is not, we believe, on the face of the earth. How much of all that has been written of its inferiority, which never fades; the productions of nature keep on in their growth through all seasons of the year. Even the natives of the country, almost without farming tools, without skill, and with very little labour, make more grain and vegetables than they can sell. Cattle, swine, fowl, ducks, goats, and sheep thrive without feeding, requiring no care but to keep them from straying. Cotton, coffee, indigo, and the sugar-canes are all the spontaneous growth of our forests, and may be cultivated at little cost, to arrive at a full share in real estate—citizenship belonging however exclusively to persons of colour; and of such, at present least, only to the free coloured emigrants from the United States, who immediately before their arrival in this country have held for a full term of years 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 who is 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, a court of appeals; the justices are appointed by the president on a vote of two-thirds of the houses of legislature. The annual revenue and expenditure average about 7000l. a year each. The republic appears to be making steady progress.

There were in 1847 in Liberia (without including the Maryland colony) 93 churches with 1474 communicants, of whom 469 were natives; there are now above 300 churches. Schools are provided for all the children of citizens. In 1847 there were 16 schools with 688 scholars, of whom 192 were the children of native Africans: in 1861 the scholars were said to exceed 5000. Three high-schools are in operation in Monrovia; and an Act has passed the legislature for the establishment of a college. The 'Liberia Herald,' a very respectable newspaper, was established in 1845, and has been published for above 20 years; one or two others have been issued within the last few years.


LIBRARIES, PUBLIC. Up to a recent period one of the first things which struck a foreigner with pain when he first landed in Liberia was the absolute absence of libraries in the towns and cities, was the total absence of free libraries. In every large town on the continent there is a public library (often there are two, four, or six), to which every one is admitted at once, without introduction or guarantee. In the smaller towns, there is a public reading room in operation—Chetham's Library, in Manchester; and even this was so ill-managed in other respects as to be of hardly any use to the inhabitants of the town in which it existed. In 1849 a committee of the House of Commons was appointed, which Mr. Ewart was chairman, and its report contained a mass of startling facts, and a number of valuable suggestions. It was shown that our public libraries were not only difficult of access compared with foreign libraries—they were wretchedly few in number. One of the most striking things in this report is a map of Europe, shaded so as to exhibit the relative provision of books in libraries accessible to the general public in the various states on the continent, excepting Turkey. They show that a small German state, and France and England are on the two extreme verges. The minor countries are, in this respect at least, white with the light of science and learning, while the British islands appear to be in utter darkness. The gradations run down the scale thus:—For every 100 of the population, there are in the minor states of Germany 450 books; in Denmark, 412; in Switzerland, 350; in Bavaria, 340; in Norway and Sweden, 309; in Prussia, 300; in the Austrian empire and the kingdom of Hungary, 299; in France, 188; in Austria, 180; in Spain, 176; in Portugal, 100; in Russia, 75; in Holland, 63 to 53; in Great Britain and Ireland, 63 to 53. Look at it how we will, such a table is calculated to put one to the blush; but after all it should be remembered that we cannot undertake out some sort of explanation. Such a statement is very likely to mislead colonial writers, not well acquainted
with England, into a grievous mistake. It is only too true that the peasant of Durham has fewer books accessible to him in public-collections than the peasant of Podolia or the Banat has—the citizen of London or Liverpool than the weaver of Catalonía and the vine-dresser of Caratia. B. It is not true that there are more books in Russia and Hungary, in Spain and Sicily, let us say, in the small principality of the Corsicans, than in Holland and England. It is not even true that there are more books accessible to the working classes in any of the countries named than in England. There are coffee-houses in the bye streets of London which have better libraries than can be found in cities of from five to ten or 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 Frath. In fact, with the exceptions of Italy, Greece, and the Spanish States, no country 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 Shakspere or Milton, a thing having no parallel in any of the countries standing higher in the above list. It is a sort of gift presented by foreigners, and in England there are 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.

This want, as of books, of pictures, and in small quantities, and in many houses, 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 masses to the higher culture of men of letters, as if by it most deplorably. Within the recollection of men still living there was no library in London, accessible to the public, even moderately complete in the great departments of inquiry. Gibbon had to purchase all the books necessary for the composition of his most great work. 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 two biographies. Still later than this, the historian of North America (Graham) found himself obliged to remove from London to Gottingen, in the same time to get access to a well-stored library, which was at the same time open to the public. Within a year or two of our own time, Robert Sou-hey 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 it were inconvenient for him to reside in London, and to attend at the British Museum in the heart of the day. How disastrous to such works, publicly accessible, operates upon the current literature of the time. No one, in fact, is able to know the present literary literature, is alone truly aware. How it operates to prevent the spread of sound and useful information among the masses, is evident to every one who has been in the habit of reading in the libraries of the capital. The case is even more in comparison, 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 men, women, letters and artists, the teachers of the people. In Paris he will find other 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 solemn black, so well befiting the avocation of letters. In the British Library the visitors are less respectful, the men from civil and military colleges, soldiers of the line in their blue-coats, officers, clerks, shopkeepers, porters, and generally speaking speaking scribes of all classes of the population. A peep over the shoulders 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 new writers—The literature of their own age. In strict truth, the British Museum is only a library of reference; the Parisian institution is a library for reading.

This is not in the theory of the two institutions which ought to lead to this variety of result; but practically it is so; and the circumstances in which the rules are founded are sufficient to explain it. The National Library is open to the public—the British Museum is not. Whenever a man finds himself in the heart of Paris with an hour's leisure on his hands, he can at once repair to the Library. No one can do this in London unless he is previously provided with a free card. The Parisian who obtains an unexpected holiday can use the institutions of his country—not so the Londoner; for although it is not difficult to get a pass card to the British Museum, it must be obtained the day before, and not in London, as Parisians can. This is the greatest advantage which the masses of Paris have over the same classes in London. To the man of letters, Paris offers still greater advantages—particularly, under proper regulations here allowed to take home with him the books he is using for literary purposes. How far in the opinion of the Committee these provisions might be safely extended to the British Museum readers, will be considered by and by.

It appears from the evidence tendered to the Committee, that,

In France there are 107 Public Libraries open freely.

- Belgium . 14
- the bishop of Bruges . 44
- Austria (with Venice and Lombardy) 48
- Saxony . 6
- Bavaria . 17
- Tuscany . 9
- Great Britain and Ireland . 1

All the great public libraries on the Continent are like the National Library in Paris; that is, they are open freely to all comers without distinction of person, rank, or country. This is as it should be everywhere; none should be sent back from the temple of knowledge who knock for admission. The following list gives the number of these public libraries in the chief capitals in Europe:

In Paris there are 7 open Public Libraries.

- Brussels . 2
- Berlin . 3
- Milan . 2
- Dreden . 4
- Munich . 2
- Copenhagen . 6
- London . 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. There is no hope for the future—there is no hope of any improvement—of 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. White, which is now containing about 30,000 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; a card of admission is obtained in much the same way as at the British Museum. Of course there are many other libraries in London to which men of letters obtain access for the objects of their craft—such as the library of the East India House in Leadenhall Street; the libraries of the Inns of Courts; libraries connected with the various learned institutions; the library of Lambeth Palace; and so on. But from 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 Square—and even that is necessarily very 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. Get the latest books more easily to the public; and not on one, 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 Aberdon, and at that of St. Andrews, the books are reading and at the disposal of 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-
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 University 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 town and parochial libraries, which are scattered about the country, which at present are neither known nor accessible—but which may constitute the nuclei of a system of public libraries by and by. These little-known and little-used institutions are, as it were, the parochial libraries. Of the cathedral collections 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 founders. In such as have, new books are added yearly; the number of volumes which they contain will average from 7000 to 10,000 in each one. In such as have not, they have had little care taken of them, and much loss has therewith been to 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. Persons have been known to contribute as much as 136 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, at a time when standing armies were 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 1770, that some of these libraries had fallen into a state of decay. It is stated in evidence that "the books lie exposed to chance, and liable to be torn by the children of the village;" as however they were originally formed chiefly with a view to their being useful to the poorer ranks of the clergy, at a time when the standard works were dear, and few parsons could boast of a well-stocked set of shelves, the works which they contain are by no means fit only for children. They are generally of a high class; but there are not very many of them unfortunately.

That the public required greater facilities for consulting better works than they possessed, was proved—first, by the more educated classes continually making our national poverty in this respect the subject of complaint in the press and in literary conversations. History, poetry, travel, political works, and so forth, books of solid thinking and high character also find their place. A cursory glance at these places, lycemns and coffee-houses, will show that the man of business, the merchant, the tradesman, the man of leisure, and the student, all use them. Such considerations as these convinced the Committee of Inquiry, that the establishment of public libraries, open and free to all comers, was a national want, expressed in the most practical and convincing manner.

The Committee were chiefly for the purpose of rendering the existing libraries more available to the general public, with occasional grants from government for the purpose of extending them. They were not adopted altogether, but the Report produced such a conviction of the necessity for doing something, that in 1850 an Act was passed (13 & 14 Vict., cap. 65) "for enabling town councils to establish public libraries and museums." There had been a previous Act in 1845 for enabling them to form museums in towns or boroughs where the population exceeded 10,000. The town councils were by the Act directed to secure, with the consent of a majority of two-thirds of the persons legally entitled to vote in an assembly called for the special purpose, to levy a rate not exceeding a halfpenny in the pound on rates for the poor rates, and for the poor rates, and to hire or purchase land, erect buildings, furnish them suitably, appoint and pay officers, &c.; the property in buildings, books, maps, specimens of art and manufactures, or purchased or acquired by donations, to be vested in the corporation on trust to be let, lent, or sold, provided that such towns or boroughs are without a city, town, or borough and other resorting thereto; the admission to such libraries and museums to be at all times free of charge. This Act was extended to Scotland and Ireland by the 17 & 18 Vict., cap. 74. Numerous towns have availed themselves of the powers of this Act in England; among others, Birkenhead, Bolton, Cambridge, Hertford, Kidderminster, Liverpool, Manchester, Norwich, Oxford, Salford, Sheffield, Warrington, and Winchester. The general results are reported in every instance to be very satisfactory. At Salford, in the first year, out of 3000 consecutive issues of books, 1331 were works of fiction; in 1855, out of the same number, only 720 were works of fiction. At Oxford it is said 535,000 volumes have been issued within the past five years; while during those five years, books, we presume, are meant, and not distinct persons; and it is reported that the public library "has proved of more real benefit, and rendered more solid advantages to the middle and working classes in this city than any other measure which has been adopted." In Cockermouth, it is said that, "a marked improvement has been noticed in the habits and manners of the people who frequent the library." The return also mentions that in Birmingham, Cheltenham, Exeter, Islington, and the City of London, the proposal for establishing a public library has been rejected.

One of the suggestions of Mr. Ewart's Committee was that, wherever the public were admitted to libraries, gas should be provided, that the artisan might use them in the evening. In most of the libraries estab"lished under the Act, the suggestion has been adopted. Another suggestion, that the library of the British Museum should be to a certain extent divided, one division containing those works best adapted for general reading, to which the public might be admitted in the evening, and the other, the great national collection of records, manuscripts, and books of reference, for literary men, has not been attempted. Such a division would certainly be a great benefit to both classes of readers. In the British Museum in London, the large and elegant new reading-room of the British Museum, even under the restriction of obtaining pass-cards, has yet too many readers to be pleasant for a student. If also, as in Paris, books could be had for a limited time to be used at home by the writer who, in fact, may readily refer, without the expense of travelling, at large, it would be an invaluable boon.

LICHENINE. [CHEMISTRY, S. 2.]
LIGNITE. [COAL, S. 2.]
LIGURITE. [MINERALOGY, S. 1.]
LILY. [LILIUM, S. 1.]
LIME, OXALATE OF. [MINERALOGY, S. 1.]
LIMISSO. [CYTRUS.]
LIMONINE. [CHEMISTRY, S. 2.]
LIMPE. [CHEMISTRY, S. 2.]
LINARITE. [MINERALOGY, S. 1.]
LINDE, SAMUEL BOGUMIL, the great lexicographer of Poland, was of immediate Swedish descent. His father was a native of Dalscarnia, which was settled at Thorn in Poland when Linde was born in 1774. After a good education in the schools of Thorn, he was sent, at the age of eighteen, to study in the university of Leipzig, where he attracted the favourable notice of Professor August Wilhelm Eulenberg, a well-known author and teacher. After some years of study, Linde, in one of the prefects to his great work, the Polish Dictionary, "struck out for me, without my knowledge, an opening to a career which he thought would be for my benefit. One day he told me, to my great surprise, that he had written a book. I was therefore surprised to hear that a chair of the Polish language and literature should be entrusted to me at the university of Leipzig. I told him, with some consternation, that I was not well acquainted with Polish; that all I knew of it was what clung to my memory.
from the mere 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 1782, however, Linde received the appointment, and began to do as much as he could among the Polish that he procured from Poland was the 'Polish Psalter' ('The Return of the Polish Psalter'), a satirical play, directed against the national failings of the Pole, which he found so excellent, that, though many passages were beyond his comprehension, he commenced a translation of it with the intention of making use of the original as a sort of study with his pupils. It 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 anonymous work. One of them, Niemiec, replied, "I wrote it." "That moment," Linde afterwards said, was "the decisive moment of my life." Niemiec was 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, Koliotaj, and Thaddeus Kocieciusko, some of the most illustrious names of Poland. Linde, who had been first heard of in Poland by 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 on February 2, 1784; he published the last volume of his great work two years and a half after, having worked at it almost unceasingly during the interval. The Dictionary of the Polish Language, 'Słownik Języka Pol斯基go,' occupies six quarto volumes, of which the first was published at the beginning of 1784, and the last in 1786. It is divided into 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 from authors in which the word is used. Linde read through six or seven hundred of the principal works in Polish, of which he gives a list in the first volume. It was the first great dictionary of the Polish language; it has been in use for more than a century, and is the only one of which the text, though of course susceptible of improvement and augmentations, 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 Omelinski 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, in which city, which he carried on in his own house by composers and pressmen, some of whom had the privilege of immortalising themselves by affixing their own names at the end. These labours were carried on during a stormy period, but the house in which the Dictionary was published was never subsequently one, and the. extension of the work was repeated by succeeding armies, and the author received support from the Prussian and the Austrian governments, and in particular from the Russian, as well as from numerous Polish magnates, one of whom, Count Zamorski, when the works on one occasion brought to a standstill 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 enabled to introduce extensive improvements. He was one of the most esteemed and respected men of his time, and was always an honest friend to his native country, and as such he was always in demand. He died in Warsaw in 1801, at the age of 72, after a long and prosperous life. The Dictionary was completed and published under the title of 'Catholic Loyalty vindicated,' 1810. He afterwards wrote several controversial pamphlets, which in 1813 were published in a volume under the title of 'Treaties on several Subjects connected with the Civil and Religious Principles of the Catholics;' and he was also the author of 'Catechetical Instructions on the Doctrines and Worship of the Catholic Church,' of which there were several editions. In 1836 he published an English translation of the New Testament, which is said to be accurate and faithful in several passages where the Donat translation is faulty. In 1845 he published the 'History and Antiquities of the Anglo-Saxon Church,' 2 vols. 8vo.

Dr. Lingard's great work, the 'History of England from the First Invasion by the Romans to the Accession of William and Mary in 1688,' was first published in 6 vols. 8vo, London, 1810,25-26; second edition in 14 vols. 8vo, 1833-34; fifth edition in 9 vols. 8vo, 1849-50; and sixth edition, 10 vols. 8vo, 1854-55. Dr. Lingard's 'History of England' is a work of great research, founded on ancient writers and original documents, displaying much erudition and sententious, and opening fields of inquiry previously unexplored. The work is well written, and the dates accurately given, and the authorities referred to distinctly. The style is perspicuous, terse, and unostentatious. The work perhaps exhibits too exclusively the great facts and circumstances, military, civil, and ecclesiastical, and enters less than might be desirable into the manners, customs, arts, and condition of the people. In all matters connected with the Church the work is, as might have been expected, coloured by the very decided religious opinions of the author. His views on the subject are not of a compromising nature. Dr. Lingard, after the completion of his 'History of England,' paid a visit to Rome, where Pope Leo XIII. offered to make him a cardinal, but he refused the dignity. He spent the last forty years of his life at Hornby, near Lastingham, where he died July 13, 1851. He was buried in the cemetery of St. Cuthbert's College, at Ushaw, to which institution he bequeathed his library. His later years were rendered comfortable by the profits of his 'History,' and a pension of £150 a year from the Queen for his services to literature.

LINOSYRIS, a genus of Plants belonging to the natural order Compositae. The heads are not radiant; florets all perfect and tubular; receptacle naked, pitted, the pappus of soft, silky, entire, white hairs imbricated; pappus piliolous; fruit compressed, silky, without a beak.

L. vulgaris is an herbaceous Plant, found in middle and
southern Europe and Great Britain. It has linear glabrous leaves, corymbose heads, the involucre lax; the stem from 12 to 18 inches high, simple and leafy; leaves single ribbed, smooth or scabrous, very numerous, more or less dotted: flowers yellow. It grows on limestone cliffs. It is the characteristic limestone of South London.

LINESERZ [Mineralogy, S. I.]

LINTON. [Cambridgeshire.]

LISTA Y ARAQUON, ALBERTO, an eminent Spanish mathematician, was born in Madrid, in 1778; and in 1797, when he was but fifteen years old, he composed a treatise on the theory of numbers, which was highly praised by the mathematicians of his time. His mathematical knowledge was profound, and his mind was quick and analytical. He was a brilliant student, and his work was characterized by originality and accuracy. His mathematical writings were widely read and admired, and his influence on the development of mathematics in Spain was considerable.

Athenaean, 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 up this duty, and returned to his native Seville, on his way to which he was met at two leagues off by a procession of friends and admirers, who escorted him to his home. He was one of the foremost mathematicians of his time in the city where his early triumphs had been won, and there he died on the 6th of October 1846. The municipality of Seville erected a monument in his honor, and his name was added to the list of the benefactors of the town.

Lista was an author of very various merit, his 'Tratado de Matematicas para y mixtas' is the standard book on mathe-
matics in Spain, and his 'Ensayo de la geometria y criticas' is considered little inferior to that of the admired Melendez. His philosophical poems in the style of Horace are peculiarly happy, and his sacred poems are superior to those of any of his contemporaries. A literary critic has published 'Lecciones de Literatura Dramatica Española' (Madrid, 1829), and his 'Ensayos Literarios y Criticos' of 3 volumes, Seville, 1844, are in high esteem, and contain a fund of valuable information for foreigners; and he has also displayed his intimate acquaint-
ance with his countrymen by publishing an excellent col-
lection of selected extracts, 'Trastos Encogidos de los mejores Habilidades Españoles en Prosa y Verso'. A translation of Seguer's French work on universal history, which he executed while in France, has a title to be mentioned from the numer-
ous additions and comments, among others, a history of Spain to a late period. As a political writer he was dis-
tinguished by his advocacy of moderate and cautious reforms; and it should be mentioned that among his poems is one entitled 'The Triumph of Tolerance', directed against the Inquisition.

LISSEMMUS. [Elatrichide.]

LISTERA, a genus of Plants belonging to the natural order Orchidaceae. It has a ringent perianth; a deflexed 4-lobed lip; the stigma truncated; the ovary 4-celled, entire, acute, with a minute globose appendage at its some-
what reflexed apex; column very short.

L. ovata, Twy-Blade, is found in woods and pastures in Great Britain. It has 2 opposite ovate leaves, the lip bifid, column with a crest which includes the anther; the stem a foot high; spike elongated, very lax; flowers small, and greenish; leaves large.

L. cordata has 2 opposite cordate leaves, 4-lobed lip; the stigma truncate; the ovary 4-celled, entire, acute; at the margin of the leaves.

LITHOSPERMUM. [Mineralogy, S. J.]

LITIORELLA, a genus of Plants belonging to the natural order Plantaginacea. It is monocious; the male flowers stalked; sepals 4; tube of the corolla cylindrical; limb rounded; stamens hypogynous; filaments very long. The female flowers sessile; sepals 3; corolla oblong, narrowed at both ends; styles long; capsules 1-seeded.

L. laxianum, has white flowers; the fertile flowers sessile; stalks of the male flower one to two inches long; leaves all radical, linear, flexuus, somewhat channelled. It is found on rocky mountains in Great Britain.

LITHOMARGE. [Mineralogy, S. J.]

LITOSPERMUM. [Montgomeryshire.]

LITFXYLLIN. [Montgomeryshire.]

L. A. ROWE. [Montgomeryshire.]

LOCHE, JAMES, a native of Scotland, was born at Drylaw, near Edinburgh, by a sister of the late Right Honourable William Adam. He was born in 1780, and called to the Scottish Bar in 1801; he was subsequently admitted within the English Bar, and in 1825 was admitted to the late Earl of Carlisle, and to the trust estate of the late Earl of Dudley, Viscount Keith, and also to the extensive properties of Lord Francis Egerton (afterwards Earl of Ellesmere), and his brother the Duke of Sutherland, which he received from the late Earl of Carlisle, and which, during the period when the title of Highland emigration had set in at its strongest. The improvements which were made on the Duke of Sutherland's Highland property were the subject of much controversy, and the late Lord Chief Justice of Scotland, Lord Cockburn, in some able publications, demonstrated that the remark of that prince was not applicable to any means of cultivating the land, to make room for profit-
able industry, was real benevolence. He was also well known as the author of a 'Statistical and Historical Account of the...
County of Sutherland,' and as a member of the council of the University of London. He represented in the Liberal interest the North West division of the Borough of South Cornwall, during the last unformed parliament, after which he sat for the Wick district of Burghs from December 1832 to the dissolution in 1832, when he finally retired from parliament. He died in Albermarle-street, London, July 8th, 1845.

LOCKMABEN. [DUMFRIESSHIRE.]

LOCHWINNOCH. [RANSTRAYSHIRE.]

LOCKER, EDWARD HAWKE, was the son of Admiral Locker, to whom Nelson, soon after the battle of the Nile, thrice presented as a young man, and whom he encountered in the early days of his acquaintance, know that nothing can alter my attachment and gratitude to you. I have been your scholar. It is you who taught me to board a French man-of-war by your conduct which in my mind was as you would wish it. I have no Frenchman close and you will best him; and my only merit in my profession is being a good scholar." The son, Edward Hawke Locker, was born at East Malling, Kent, on the 9th of October 1777. He was educated at Eton, which he left in 1786, 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 Exmouth. From that time till the peace of 1814, he was associated with that distinguished commander in arduous and confidential duties, especially when, as Pay Master General, he was sent to the Mediterranean, which he 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 was afterwards the President 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 1802, but which has not been continued beyond the first. R. B. 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 want of books suited to the large class who had learnt to read under the new system 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 joinedly edited 'The Plain Englishman,' almost the first, if 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 impressively demanded, in the place of miscellaneous or childish trash. Mr. Knight, a friend and admirer, as the present Archbishop of Canterbury, were among its contributors. Mr. Locker's own papers in the miscellanies are excellent models of popular writing—plain, energetic, affectionate, and unaffected, which, on the British soil, have been reprinted in a separate volume; 'Lectures delivered to the Crew of the Caledonia, Lord Exmouth's flagship,' 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 exceeded 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.' He died on the 15th of October 1849.

LOCKERBIE. [DUMFRIESSHIRE.]

LOCKHART, JOHN GIBSON, was born in 1794 at the manse of Cambusbethan, in Lanarkshire, Scotland; his father, who was an old Lanarkshire family, being then minister 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 Cambusbethan to Glasgow, which was about one mile west of the city, where he resided in a small house near the Custom House. John Lockhart was educated. 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 voices of the professors, the Smellie Scholarship. In 1811 he was granted B.C.L. at the University of Glasgow. He could not, however, either on the same exhibition or otherwise, obtain a sufficient income to enable him to support himself either in Scotland or in Germany, 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 time he was first met to the end of his life, he was associated with the little band of young Scotch Tories, who, with Wilson as their chief, were then beginning to dispute the literary supremacy of the Scotch Whigs, as represented by Jeffrey and his 'Edinburgh Review.' When the 'Black-Hart' was in existence, he was one of its chief contributors; and considerable portions of the famous 'Chaldee Manuscript,' and of the earlier 'Nec toes Ambrasienses' papers were written by Lockhart, though Wilson afterwards made the magazine his own. He was in consequence of Lockhart's lifelong connection with 'Blackwood' and Scottish Toryism that he became acquainted with Scott, who looked with a kindly interest on the efforts of these young men of the same politics as himself. The first meeting of Scott and Lockhart took place in 1816, when Lockhart, in a letter to his friend John Wilson, then editor of the 'Edinburgh Annual Register,' recommended Lockhart to the Ballantynes as his substitute. In 1819 Lockhart was appointed editor of another Edinburgh periodical, the 'National Magazine,' which gives such graphic accounts of Scottish men and manners at that time. In 1820 he married Scott's eldest daughter Sophia, and took up his abode at the cottage of Chieflawood, close to Abbotsford. How perhaps he spent his happiest days and few passages in Scott's life are pleasant rather than those describing his walking over early in the morning to breakfast with the young couple at Chieflawood, or helping their servants on a summer afternoon, when they were both out of doors. As a writer he contributed to 'The Blackwood' and to the 'National Magazine' for six years; and from 1829 to 1832 he edited the 'Companion.' At this time he published the 'Life of Napoleon,' for 'Constable's Miscellany.' In 1836 Lockhart removed to London to succeed Gifford in the editorship of the 'Quarterly Review.' He continued to edit it until his death, and the name of Lockhart is associated with every page of it so well known. 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, combining with the utmost 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 now taken its place 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 his illustrious father-in-law had the benefit of his actual assistance in the management of his affairs. Of this it is difficult to say whichruined the close of his life could certainly never have happened. In 1843 Lockhart was appointed by Sir Robert Peel to the office of auditor of the Duchy of Cornwall, with a salary of £3,000 a year. He was a man of very moderate income who he had inherited some family property, he was 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 wife died in 1837; his second only surviving son died at a later period; and there remained only...
one daughter. This lady, who was also (by the death of Mrs. Locker, his eldest brother childless in India, that of the younger brother unmarried, and that of her sister) the sole remaining descendent of the family, married Robert Hope, Esq., barrister-at-law, and is now proprietress of Abbotsford. Along with her husband she embraced the Roman Catholic faith. She usually lives at Abbotsford, and has a daughter, born in 1822. Locker, broken in health and spirit, lived to see his own pedigree and that of Scott centred in this child—his grand-daughter and Scott's great-grand-daughter. Gradually becoming more shattered, he resigned the editorship of the "Review," and went to Rome. To support property in Scotland he retired to Scotland. He died at Abbotsford, November 25, 1854, in the sixty-first year of his age. To the last he retained something of the handsome aristocratic appearance and the manners, always reserved, had become chillingly so before his death; but those who knew him intimately, maintain that, beneath his morose and iron demeanour, his scornful smile, and his withering sarcasm, there lay a host of qualities which commanded the thorough respect and affection of those whom he did admit to his friendship, or who were related to him by blood or affinity.

LOGANIACEAE. Logania, a natural order of Exogenous Plants, consisting of shrubs, herbaceous plants, or trees. It is characterized by a perfect staminate flower, usually without stipules, which adhere to the leaf-stalks or are combined in the form of interpetiolar sheaths. The flowers are racemose, corollary, or solitary; the calyx valvate or imbricate, the corolla villose, the anther 4-5-6-10-cleft, with valvate or convolute masturbation; stamens arising from the corolla, all placed upon the same line, and not always symmetrical with the divisions of the corolla, pollen with 3 bands; ovary superior, 3-celled; ovules solitary or in small axillary clusters; fruit either capsule, 3-seeded, with placenta finally becoming loose or drupaceous, with 1-2-3-seeded stones, or buried with the seeds immersed in pulp; seeds sometimes winged, usually peltate, albumen fleshy or glabrous; embryo small, with the radicle turned towards the umbilicus. All parts of the plant are aromatic. They are either tropical or inhabit countries near the tropics, a few in America and Australia forming the only exceptions. It would be difficult to name a more poisonous order than this, of which the celebrated Usus vomiun may be taken as representative. Notwithstanding the active qualities of these formidable plants, some are used in medicine with great advantage. Several of the species of Strapacos are used in the East as remedies for various disorders. Onaman, a variety of Cineraria, and the Beas, are employed in India for cholera. Speciosa yields also several species which are employed for useful purposes. The order consists of 22 genera and 162 species. It is related to the Commelinaceae and to the Commelinaceae, and is used by the Balsas. The usages of the species will be found under their respective heads, Spokkia; Strachan; &c.

LONDON PRIDE. [Saxitraga.]

LONDONDERRY, CHARLES WILLIAM VANE, THIRD MARQUIS OF. E.P., O.G., G.B.H., only son of Robert, first Marquis, by his second wife, Frances, daughter of Lord Chancellor Camden, and half-brother of Robert, second Marquis [5.1], was born in Dublin, May 18, 1778. Charles William Stewart was in his fifteenth year when he received his first commission as ensign in a foot regiment, and embarked under the Earl of Moira (afterwards Marquis of Hastings), to relieve the Duke of York from the perilous position in which he found himself after the reduction of York and the capture of Charlestown. Having held this post for a few months the post of Assistant quartermaster-general to a division of the forces under General Doyle, he was attached in the following year to Colonel Crawford's mission to the court of Vienna; and while thus occupied he received a severe wound at the battle of Deslanes. Returning home, he was appointed to the command of the 15th Light Dragoons, by which he accompanied to Egypt under Sir Ralph Aber-
ing an elongated body, with dorsal fins and one anal fin, a chum with one or more barbules. *L. melops.* The Ling, is a very valuable fish, scarcely less so than the Cod, and already taken among 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 remainder is mostly used to salt, cleaned, bled, washed, and dried, but the demand generally falls short of the quantity cured, and the hardy fishermen are but poorly requited. The ports of Spain are the markets supplied; and so extensive an article of commerce in Ling fish is considered as formerly an Act for regulating the price of Ling, Cod, &c., was passed as early as the reign of Edward III. The air-bladders, popularly called Sounds, are prepared separately, and with those of the Cod-Fish are sold pickled. The roes, which are very large, are also salted, as food, or preserved 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 Zeland 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 haunts are about the margins of the rocky valleys of the ocean.

The Ling is exceedingly prolific, and has a most voracious appetite; no fish is able to get anything in its way that has life, and the prey is swallowed whole, so that no great art is required to catch it. It is tenacious of life, and survives great injury. Mr. Couch says he once saw a Ling that had swallowed the usual large hook, shaft foremost, of which the fisherman had fastened the line round the tracks of the fish, and when it turned round, entered the opposite side of the stomach, and opened the organs together in complicated folds; yet having escaped by breaking the line, it survived to swallow another hook, and was taken several days after.

The most usual length of the Ling fish is from three to four feet; Pennant mentions having heard of one which measured seven feet; and Mr. Couch 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 extremity; teeth in the upper jaw small, and very numerous, those in the lower jaw longer and larger, forming but a single row; lateral line straight, scales small, firmly adhering 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, immerses itself, reaching the caudal fin, the posterior portion the most elevated; vent in a line with the eighth or ninth ray of the second dorsal fin; the fin immediately behind it is long, resembling the second dorsal fin, and terminating on the same line with it; caudal rounded at the base, and slightly emarginate in front, and blackish in colour; sometimes cirrhus without the olivaeeous tint; 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. vulgaris.* The Burbot, or Ele-Pont, is the only British species of this numerous family of fishes that lives permanently in fresh water, and prefers in this country slow running rivers; but it is neither so generally known, nor so much frequented, as from its flesh 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 several 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, crustacea, small fish under arches, into which such small and weak animals are likely to be brought by the current of the water. It feeds principally during the night, and the light, is most often caught by trimmers and night-liners. The Burbot is sometimes called the Cow-fish, from the manner of its swimming, hunching itself up, as the eel does also. In this country it has been known to attain the weight of 45 lbs., but a common weight is about 2 lbs.

The flesh is firm, white, and of good flavour, and is some considered superior to that of the eel. As the Burbot is extremely hardy, it might be increased in any quantity, which would amply repay the labour 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, small scales on the upper jaw; gill-opening large; the length of the head as compared to that of the body of the eels is as one to four; the form of the body cylindrical, compressed posteriorly; the first dorsal fin is small and rounded, the second dorsal fin with 13 rays, the anal fin nearly uniform in height; ventral fins 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 oval and slightly pointed; the body yellowish-brown, clouded and spotted with darker brown, and covered with a mucous secretion; under parts lighter; the lateral line indistinct and straight; scales small; the fins partaking of the colour of the part of the body from which they emanate, those of the lower series being much the lightest. (Yarrell, British Fishes.)

LOTUS, a genus of Plants belonging to the natural order Liliaceae, which contains four species annuals, each with a keel ascending with a narrowed point; the wings are convergent at their upper margin; longer filaments dilated upwards; style knotted at the base, filiform, subulate; pod linear; many-seeded, 2-valved, imperfectly divided by transverse partitions.

*L. corniculatus.* Common Bird's- Foot Trefoil, is found in pastures and on dry banks in Great Britain. The claw of the standard is obvate, transversely vaulted; calyx-teeth straight in the bud, subulate from a triangular base, heads 6-10-flowered. The plant is glabrous or slightly hairy; stem ascending; leaflets oblongate; stipules ovate; angle between the two upper calyx-teeth rounded.

*L. angustifolius.* This is the round of the standard linear; calyx-teeth spreading like a star in the bud, subulate from a triangular base, two upper ones diverging; heads 8-12-flowered; leaflets obvate; stipules roundish ovate.

*L. angustissimum* is found in the south of England, near the sea. It has the claw of the standard linear; calyx-teeth straight in the bud, subulate; pod linear eight times longer than the calyx; beak straight; head about 5-flowered.

*L. glutinosus* is found near the sea in Devonshire and Cornwall. It has the claw of the standard subulate; calyx-teeth straight in the bud, subulate; pod rugose, terete, twice as long as the calyx; beak elongate, sessaceous, bent downwards; heads few-flowered; leaflets obvate-lanceolate; stipules have persistent basal laminae. There are many European species of this genus, none of which are of any importance.

LOUGHOR. [GLAMORGANSHIRE.]

LOUIS PHILIPPE, King of the French, Duc d'Orléans and Chartres, and Count de Neully, was the eldest son of Louis Philippe Joseph, Duc d'Orléans, the Philippe Égalité of the Convention [Orléans, House of], and Louise Marie de Bourbon, daughter of the Duc de Penthièvre.

Louis Philippe was himself born at Paris, October 9th, 1773. His youth was marked by the spirit of benevolence, and the judicious teaching 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 1792 he was the young Duc de Chartres, having been nominated to the colonelcy of the 14th regiment of dragoons, 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 this same corps, and he was rewarded by that time exacted by the government from all ecclesiastics. On this occasion he showed great tact and presence of mind, and subsequently received the honour of a civic crown from the mob itself. He was made a general and an engineer of that place, from drowning. By these means he became popular among the French people. In August 1792, the young duke quitted Vendôme command of his regiment for Valenciennes. Whilst he was stationed there, he was proclaimed against Austria, and in the April following...
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 Jemappes. At this period the Revolution was rapidly advancing to the crisis. France was nearly exhausted, and had been passed (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 Égalité, his parents and Comte de Beurnonville, retired from Paris, where, having been made the dupe 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 seven months after this date the young duke remained at his father's seat, the Château de Meudon. 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, he at once resolved to make their escape into the Netherland, then in possession of Austria. The Austrian authorities gladly received the fugitives, and even offered to bestow on the duke 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 Liége, Aix-la-Chapelle, Cologne, and Coblenz, towards Switzerland. The resources at his command were very limited, and he soon arrived in the north-west. His sister Adelaide, known in history as Madame Montes Hellé d'Orléans, at the same time fled the country together with Madame de Genlis, and met her brother at Zurich. The authorites of that canton, in fear of the French government, deprived the duquesse and her companion of the abode in Zoug; but being discovered, the duke placed his sister and Madame de Genlis in the convent of St. Claire, near Baumberg, adopted the disguise of a traveller, and started on a fresh journey of danger and adventure.

His first stop was at Gotz, where he received from M. de Montesquieu the offer of a post as professor in the college of Reichenau, close by the confines of the Upper and the Lower Rhine. He at once offered himself for examination. The examination was held in the Château de Chasaed, 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 Baumberg, 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 Copenaghen to Copenhagen and to London, where he remained almost entirely on foot, as far as the North Cape. Meantime 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. They agreed to it, and the young prince returned to Paris, and the Comte de Beaunoin, who had been thrown into prison as dangerous subjects, and at the same time in order to procure the restoration of his mother's estates which had been confiscated, Louis Philippe (whom we shall henceforward 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 spent in the United States, and toured the western portions of the States. In the course of this excursion, the duke gained great repute for his medical skill, by the facts of a vein in his arm in an attack of fever. He afterwards performed the same operation for an Indian chief, in revenge of an injury, which 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, where they were received with respect, or even with civility, they went on 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 Georgeville, 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 Duc d'Orléans also began to decline, and in March 1810 he was urged to retire to Palermo. It so happened that Ferdinand, king of Naples and Sicily, was dwelling in that city under the protection of the British flag, while Murat occupied his throne in Italy. During his absence the Duc d'Orléans had made friends with 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 entrust to his hands the regency of that country.

In 1814 he witnessed the fall of Napoleon I., and of the intended restoration of the Bourbons. The duke returned to Paris without delay, and was re-instanted in his honours and military rank. The return of Napoleon in the early part of the following year again disturbed the peace of the country. The Orléans 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 March, and retired to Twickenham, whence he returned to 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 acquiescence in the changes and 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 disguise and revenge, forbade princes of the blood royal to appear in the Chamber of Peers. The Duc d'Orléans revenged himself upon the court by entering his son in one of the public colleges as a commoner citizen—"le Diable de Twickenham." He continued to live in privacy at Twickenham during the remainder of that king's life and the first few years of the reign of Charles X. He did not return to France until 1827, when he took up his abode at the palace of Neuwilly, where he continued to reside until his death. The political revolution which occurred which ended in his elevation to the throne as King of the French. Charles, whose weakness and duplicity were his ruin, was now in effect discarded; and the cause of the elder branch of the Bourbons being pronounced hopeless, the struggle of the three days of July was followed by a provisional government, in which Lafayette, Lafayette, Thiers, and other politicians, took the lead. They naturally turned to the Duc d'Orléans, and in the name of the French crown, the crown. The crown was formally accepted by the Duke of Orléans, who 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, where they were received with respect, or even with civility, they went on 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 Georgeville, the Marquis of Hastings, and the leaders of the politics and fashion of the day. An Orléans mania
of the 'Napoleon of Peace,' as Louis Philippe liked to be called. His reign was a period of corruption in high places, of internal restriction to the press, and of a fraudulent and heartless policy towards the allies of his country, whose goodwill he more especially forfeited by his over-reaching conduct in regard to the marriage of the Duc de discs, and whose support during the Crimean War he pass that the heart of the nation became alienated from his king; and when a trifling disturbance in February 1848 was aggravated into a popular riot through the audacity of a few ultra-republicans, Louis Philippe felt that he stood alone and unsupported by the king, his land abroad, and that the soldiers were his only means of defence. He shrank from employing the bayonets against his people: he fell in consequence, and his house fell with him. The king fled in disguise from Paris to the coast of Normandy, and took refuge with a safe regent, his son, to a land, to which his family had already made their escape. He landed at Newhaven, March 3rd, 1848. The Queen of England—who, in 1848, had enjoyed the hospitality of Louis Philippe at the Château d'En, his royal residence near Dieppe, and who had entertained him in the following year at Windsor, and conferred on him the order of the Garter—immediately assigned Claremont, near Esher, as a residence for himself and his exiled family. From the time of his arrest, his health began to decline; and he died on the 26th of August 1850, in the presence of Queen Amelie and his family, having dictated to them the conclusion of his memoirs, and having received the last rites and sacraments of the Church at the hands of his chaplain. He was buried in the Catholic church of Christ Church, at Weybridge, Surrey, and an inscription was placed upon his coffin, stating that his ashes remain there, "donec Deo deambulante in patribus avitos inter cines transfer," etc.

LOUVAIN. [HALORIAN, S. 82.] LOWESTOFFE, or LOWESTOFT. [SUFFOLK.]

LOUCLASE, a Mineral belonging to the anhydrous aluminates of Alumina. It has nearly the form of Felspar, but is distinguished by a cavitous or pustulose substance on the 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 Fyroxene, Graphite, and Calcsap.

LOYDIA, or LOYDIA, 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 trinervig.; seeds angular above, flat beneath.

L. serrata is a native of Welsh mountains. It is a rare plant, but is found on Mount Snowdon. The root-leaves are semi-cylindrical; stem-leaves dilated below and sheathing; flowers mostly solitary, nectary a transverse plate. The height is 5 or 6 inches. Stem and leaves springing separately from the root, stem may of theใบpetals not several, short; flowers white, with reddish lines internally.

LUCANIA, a province of ancient Italy, bounded N. by the Silarus, the Apenines, and the Bradanus, which separate it from Campania, Samnium, and Apulia respectively; E. by the Gulf of Tarentum, along which it extended to the mouth of the Crathis; S. by Bruttium; and W. by the Tyrrenian Sea, between the mouths of the Laus and Silurus. The territory of Lucania is now comprised chiefly in the modern provinces of Basilicata, portions of it are included in Calabria and Principato Cita. 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 Taranto in the Bradanus were—proceeding from the north, the Caesuvum, the Aca- landrus, the Acitra, 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 Caesuvum; Herculaneum, near the mouth of the Acitra, and on its left bank; a little higher up the right bank was Pandoeis; Siris, near the mouth of the Siris and on its left bank; Sybaris, near the mouth of the Sybaris; and Thurii, a few miles higher up, in the plain between the Crathis and the Sybaris. On the coast of the Tyrrenian Sea, between Pandoeis and Sybaris, a few miles more, and near the coast of the Silurus and Eela, or Velia, further south, on the Bay of Eela, and a few miles north of the promontory of Palmarina.
L. Binduca is a native of Hindustan. It is a climbing discicious plant; the leaves are toothed and 5-angled. Male flowers in racemes. Female flowers solitary; fruit round, ovoid, and long, ciliate bristles. It is considered in northern India a powerful in cases of dropsy. The English are partial offenders of the natives of India, and are esteemed very wholesome.

LUG-WORM. [AZEMOSSA, S. 2] LUMINOUSITY OF ORGANIC BEINGS. Organic bodies, under certain conditions become luminous, and upon the supposition that this is due to the partial combustion of phosphores at a low temperature, the phenomenon has been called phosphorescence. This luminosity is very constantly developed under the same circumstances in Lucifera and other species of this order. The decomposition of the bodies of plants and animals as well as 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 observed that it takes place when the wood is allowed to decompose in a dry place. When exhibiting this property will retain it for a long period when kept in a dry place. Albrecht observed luminosity in a tree during the night at a spot where one of its branches had been cut off, the air being still appearing like smoke and enabling us 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 plants is unknown, but it is probable that the transparent fluid of the tissues attended with a union of oxygen gas, but what determines the development of light under these more than other circumstances is still unknown.

In living plants luminosity has been frequently observed. It is most constant amongst some forms of fungi, especially of the genus Rhizomorphs. In the coal-mines of the vicinity of Dresden the species of Rhizomorphae are so numerous as to "dazzle the eye of the brilliant light they afford." [Braune, S. 1.] The light from decaying wood, as also from the living Rhizomorphae, continues although they are immersed in insipratable gases, ligneous, hydrophoric acid, oxygen, &c. The phenomenon in both the living and the dead plants is probably due to the same cause.

Another class of plants in which light has been observed is the Mosses. Several species of the genus Schistozoa, which grow in caverns and other damp places, have been observed to give out light. Mr. Babington and other botanists, as well as E. Copitz, have conned the mosses of Funk, Brandenburg, Nees von Esenbeck, Hornschuch, Strove, Unger, Bridel-Briderei, and Agardh, have observed it on the continent of Europe. The two latter attributed this light to a small alga, which Bridel-Briderei called Colopneuris Lemnysmus, and Agardh called Protococcus Lemnysmus, which they supposed was parasitic on the moss. Unger however has examined the moss accurately, and finds that at certain seasons the satellites of this moss assume a globular form, and being partly transparent, the light is refracted and reflected in such a way as to present a luminosity on the surface of the vesicles.

Another class of these phenomena is that which is exhibited by the flowers of some plants. The first observation that I made of this phenomenon was made on a flower of the daughter Christina Linne. She was walking in the garden one hot summer's evening, when she observed the flowers of Tropotomus 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 on this as well 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 others, but which I have not been able to procure. I have seen it, the others have seen it also. A correspondent of the 'Gardener's Chronicle,' October, 1843, says, "I have frequently observed the luminous appearance of garden plants, and I am absolutely sure that I have seen it on the double marigold, and more especially on the Petunia, the hairy red poppy, in my garden in Worcestershire. In the evening after a hot dry day, the flashes of light have afforded me much amusement to myself and others." It is this phenomenon that Coleridge alludes in the following lines:

""Tis saith on summer's evening hour The golden-scorner's flower A fair electric flame.""

Decaying animal bodies frequently emit a luminous appearance, which has generally been attributed to the presence of phosphate of lime in their skeletons, which become decomposed and yield phosphorus when exposed to the action of organic compounds in a state of decomposition. The luminosity of the decaying fish is attributed. But the emission of light is a very constant phenomenon of many of the invertebrate animals under peculiar circumstances. Thus during warm weather, when the sun's rays are not too strong, when the ocean, the waves frequently exhibit a diffused light with here and there a concentration of a brighter light. This occurs in our own climate, but the phosphorescence is much more brilliant in tropical seas. Foppig, in his 'Reise in Chili, Peru, und auf dem Amazon-strome,' describes this phenomenon in an equatorial sea.

"While the north side of the vessel is still illuminated by the last fading rays of the evening sun, and the opposite side darkened by the shade of the sails, the sea in this direction already becomes brilliant. One spot after another begins to be illuminated, illuminating with light coming from greater depths, till at last, with the approach of night, a new creation seems to be called into existence. These illuminated beings move in various directions, sometimes appearing as if they were preparing to strike at others darting through the dark surface of the water like a rapid flash of lightning. A great number of these beings are undoubtedly true night-animals which conceal themselves during daylight in the dark depths of the ocean.

These lighted fish are principally produced by various species of the family Acalephæ. [Acalepha; Pulmoidea.] The light emitted by these animals seems to be due to the secretions on the surface of their bodies, for when this secretion is removed it retains for some hours its luminous character, and will even impart it to milk or water. But this property is not confined to the Acalepha. Many species of Polyopera, some of the Echinoderma, and the lower forms of Molusces also exhibit this appearance. Some few of the Crustacea and even Fishes have been observed to possess the same property.

Amongst insects this phenomenon is not uncommon. Those which possess the greatest luminous power belong to the Coleoptera, the Beetle-Tribe, and of these the two families represented by the Fire-Fly—the Eleutheria—and the Glow-Worm—the Lampyrida, are the most distinguished. [Eleuthera; Lantimida.] Some of the species of the tribes of Myriapod and Amneida give light occasionally, as the Centepede and Earth-Bugs. (Meyer; Pflaumen-Physiologie, band ii.; Carpenter, Animal Physiology; Lancaster in Gardeners' Chronicle, 1843.)

LUNACY. The statutes mentioned under this head [Lunacy, S. 1, p. 225] have been to some extent repealed, and their administrative provisions have been consolidated and amended by the Lunacy Regulation Act, 1853, 16 & 17 Vict. c. 70, by which the proceedings of the Court of Chancery in the care and custody of lunatics are now regulated. The Lords Justices of the Court of Appeal in Chancery have the same jurisdiction in matters of lunacy as the Lord Chancellor, and by them indeed are proceedings in such matters now usually disposed of.

LUNACY (SCOTLAND). The previous statutes regulating the care and custody of lunatics in Scotland are repealed, and the whole law on this subject consolidated and amended by the statute 20 & 21 Vict. c. 71.

LUNGS. The development of the lungs has been recently investigated, and the following is Kölliker's summary of what is known:

"In the Mammalia the lungs appear a little after the liver, in the form of two hollow protrusions of the anterior wall of the pharynx, which are in close apposition, and soon become furnished with a complete covering of the larynx and trachea—and in the composition of which the epithelial tube and the fibrous membranes of the intestines take an equal share. In the further course of development there springs from the extremities of the original protrusions a complex system of bronchi, which issues in the lungs, by such processes, which differ entirely in what may be observed in most other glands. From their first formation they are always hollow, and in the sixth month the air-cells are developed.
from their invariably clavate dilated extremities. During this growth of the glandular elements the interior epithelium extends downwards, forming the thickenings of the multilocular cells (probably by division), whilst at the same time the fibrous layer surrounding them also grows, and finally constitutes the fibrous membrane of the bronchi and air-cells, together with the vessels and nerves. In the second month in the case of the lungs it becomes well formed; and besides them smaller divisions also, 0.16" in size, may be recognised, originating in the dilated extremities of the bronchi, which even at this time are considerably ramified. As development proceeds, ramifications of one bronchus are multiplied; these gland-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 0.25"-0.45" in size, each of which is filled with the first inspiration, 0.03"-0.04"-0.06"; 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 by the growth of the lungs," continues the translators of Kööller, "presents no real difficulty, except in one point; that is, with respect to the relation of the pulmonary cells to the terminations of the bronchi, 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 bronchi. If it be desired to investigate the whole subject, inflated and dried lungs (it is better in air) are used, and on an end it is cut by itself, or corroded 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 bronchi is completed, the injection of the air should be the same, tho less conveniently, a well-fitting syringe may be employed. The injection of the blood-vessels is readily effected, and the preparation should be kept moist; sometimes when injected dry by itself, the processes of Schröder and Haring, with transparent substances (Prussian blue, &c.), dried preparations are to be preferred. The air-cells and bronchi, the larynx and trachea, are readily examined. The epithelium is obtained in thin sections through the lung, as well as clissated cells. If it is wished to study the alveoli, the air must previously be carefully removed. These are best displayed in man, in whom also other parts such as cartilage, elastic elements, muscles, and glands, are easily obtainable."

(Kööller, Manual of Human Histology, translated for the Sydenham Society by Busk and Huxley.)

LYCOPODIUM. [Convar. S. 2.]

LYCOPODIUM, a genus of Plants belonging to the natural order Solanaceae. It has an uncolate calyx regularly 5-toothed, or irregularly 3-5-cleft; permanent corolla funnel-shaped or tubular; limb 5- or 10-cleft, or toothed, imbricate in accilation, sometimes plicate; stamens 6, usually exserted, filaments banded and widened at the base; stigma pellately depressed, or capitellate, bisulcate; berry roundish, 3-celled, propped by the permanent calyx; placenta adnate; seeds numerous, reniform. The species are trees or shrubs usually stiff. Corollas white, yellow, rose-coloured, purple, blue, or scarlet.

L. europaeum has erect loose branches; buds spinescent; leaves fascicled, obovate, lanceolate, obtuse, or spatulate, bluish, glabrous; flowers twin or solitary; corolla funnel-shaped; stamens 6, the filaments being jointed at the base; they are a native of the south of Europe and the north of Africa: in the Grecian islands common in hedges, but scarcely indigenous. The calyx is 5-cleft, ruptured at the side: the corolla pink, or vinwarded with red veins: tube greenish. Clarius says that the young shoot are eaten in Spain with oil and vinegar.

L. barbatum has dependent branches; buds spiny; leaves lanceolate, flat, glabrous, acut; flowers twin, extra-cauline, bluish, glabrous; pollination by insects equal in length to the limb. It is a native of the north of Asia, Africa, and south of Europe. There is a variety hairy pale corollas and yellowish-red berries.

There are about 30 species of this genus described, most of which are found in the forests of India. They are commonly known by the name of Box-Thorn.

LYCOPODIUM, a genus of Plants belonging to the natural order Lycopodiales. It has 1-celled 2-valved capsules, containing 2 seeds, and a large prostrate root.
LYCOPUS, a genus of Plants belonging to the natural order Labiata. It has a 4-fld corolla, scarcely longer than the equal 5-toothed calyx; stamens 2; anther-cells parallel or subitimately divergent; 2 upper stamens wanting, or rudimentary, or rarely perfect.

L. Europaeus 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 ovate-oblong leaves, glabrous or pubescent, opposite. Flowers small, in dense whorls. It is found on banks of streams and ditches in Great Britain.

LYDD. [Kavr.]
written on botany, geology, 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 laborsious original investigator. Whilst he lived by natural history as a profession, he pursued it both in theory and in practice, and in which it afforded towards the necessities 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 the ardent character—expressed 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, even those with whom he most differed will be heard only to admire."

MACHAIRIUM, a genus of Plants belonging to the natural order Leguminosae. One species, M. Schomburgktii, produces the Inaka Wood of Guyana, remarkable for its brown and black streaks, on which it is employed in cabinet-work.

MACHYNLEETH. [Montgomeryshire.]

MACLURA, a genus of Plants belonging to the natural order Moracese. The fruit of M. aurantiaca, the Osage Orange, is as large as the fist, orange-coloured, and filled with a yellow fleshy alime, with which the native tribes smear their faces when going to war. The wood of M. tinctoria is the dye-wood called Fustic; it contains Morine, a peculiar colouring substance; its fruit is pleasant; and used in medicine. In medicine it is employed for the same purposes as the black mulberry in Europe. According to Martius, both the other species of the genus yieldustain in Brazil. (Lindley, Vegetable Kingdom.)

MACROCYSTIS, a genus of plants belonging to the natural order Lepidocarpaceae, and the tribe Laminaceae. The enormous fronds produced by M. pyrifera have been spoken of by many navigators. They appear to be from 500 to 1800 feet in length; the leaves are long and narrow, and at the base of each is a vesicle 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 packthread. This plant was seen by Dr. Joseph Hooker in 61° 8' S. and 12° 43' W. in vegetating patches wherever the water was free of ice-bergs.

MACROPITERYX. [Night-Jars.]

MACROGLOTTIS. [Chiropter.] A genus of large bats.

MACROOM, county of Cork, Ireland, a post and market-town, and the seat of a Poor-Law Union, is situated on the river Sullane, 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 1634 miles S.W. from S. from Dublin. The population is 3757, in 789 houses. The Macroom Poor-Law Union comprises 25 electoral divisions, with an area of 179,108 acres, and a population in 1851 of 37,394. The town consists principally of one street nearly a mile long, and is in great part by cabins and other mean dwellings. Near the market-place are some 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 13th day of May, July, September, and November. There is a large weekly market. Macroom Castle is a fine old structure overhanging the river.

MACROPUR, a genus of Plants belonging to the natural order Pterocarpaceae. M. mephitis, the Avr., is the most celebrated of the narcotic Pepper-Worts. It has a dextro 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 Obetahians make use as a medicine; they make themselves drunk, after which violent convulsion of the stomach."

MACRORHINUS, [Sagal.]

MADATUES. [Chiropter.]

MADELEY. [Chiropter.]

MAES. [Mae., S. E.]

MAGENDIE, 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 Comunes de Paris. He also encouraged his son to take an interest in the study of anatomy and neglect of his child, who is said not to have been able to read at the age of ten. He was however then sent to school, and at the age of fourteen had achieved such success that he was rewarded with a prize at the annual concours. Through his father's influence he was appointed a headmaster of a school and boy, 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 of Paris. A few days after his appointment he occupied the chair of the new position he devoted himself enthusiastically to the study of anatomy, 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 throne of France, in the chair of anatomy in the College of France. Professor Magendie was a laborious writer as well as one of the most illustrious physiological experimentalists and discoverers. His larger works are as follows:—1, "Formulaires pour la Préparation et Emploi de Plantes nouveaux Médicamenteuses," published by the Paris Government in 1828. It was speedily translated into all the languages of Europe. It contained an abstract of the action of these potent active principles found in plants, which had at that time been introduced into the practice of medicine, more particularly by the French chemists. The work included such remedies as morphine, strychnine, prussic acid, and others, on the operation of which an animal system Magendie had successfully experimented. 2, "Prix Élémentaire de Physiologie," published in two volumes at Paris in 1816-17. It went through several editions, and was afterwards entitled, "Éléments de Physiologie." It was translated into German and English, and for many years it was one of the best manuals on physiology for the use of students. 3, "Leçons sur les Phénomènes physiques de la Vie." These were a series of lectures delivered at different times, and collected together by M. J. James, and published in 1836-41. These were also translated, though not very accurately, into German. 4, "Leçons sur les Fonctions et les Maladies du Système nerveux." These were also lectures delivered in the College of France, and were published in two volumes in 1839. 5, "Leçons sur le Sang." These lectures on the physiology of the blood were included in the "Essais philosophiques et cliniques sur le liquide cephalo-rachidien," by Pierre, Paris, 1842. In addition to these larger works, Magendie published a large number of papers, which will be found scattered in the "Comptes Rendus," and was a contributor to the "Journée de Physiologie expérimentale," 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 wrote for the "Dictionnaire de Médecine et de Chirurgie pratique," the "Encyclopédie des Gens du Monde," and the "Dictionnaire de Médecine utile." Although Magendie retained the generalizing power which he had displayed him at the head of European physiology, he was most industrious in the performance, and ingenious in devising of physiological experiments. It was as an experimenter that he produced a lasting impression on the progress of physiology. In fact, no numerous were his experiments one time on living animals, that the authorities is France thought it necessary to interfere. Some of the results of his physiological enquiries are too important to be passed over in this notice:—He successfully demonstrated what had been only suspected by previous physiologists, that the veins were organs of absorption. His experiments on this subject have been regarded by physiologists as setting the question at rest, and proving that the veins are the great agents of absorption of the blood.

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
strypnia acts upon the spinal cord, and destroys by paralysis the nerves of respiration, thus inducing apoplexy.

4. He investigated with great care the action of hydrocynous vapours on the nervous system, and directed attention to its value as a remedy in certain forms of a rising 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 injurious. This was the result of a long series of experiments on the feeding of the lower animals.

6. He performed a series of experiments on the admission of air into the veins, and showed how likely this was to be a source of death, in operation.

7. Magendie, with Sir Charles 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 separate functions, seems to have been first clearly established by Magendie.

To 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 helped to prepare the ground for others that have since guided to more correct conclusions.

Magendie was 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 result of a long series of experiments on the feeding of the lower animals.

As a result of his great talent and original genius. He died on the 8th of October 1855.

MAGHERAFLET. [London.]...
ship. Selecting from the vast and still then imperfectly explored manuscript treasures of the Vatican, he prepared his 'Classici Scriptores ex Codicibus Vaticanis editi,' a vast series of ten 4to volumes (Rome 1825, and following years), on the plan of the various 'Anecdota,' published under different titles by Mabillon, Pay, Mazaras, Muratori, and others. It is a work of immense labour and research, destined for generations of scholars. It contains a vast amount of Latin, sacred and profane, theological, historical, patrimonial, and philosophical. One of the volumes, the second, is perhaps the most curious of the entire, containing considerable fragments, recovered from a vast variety of manuscript sources, including the ancient Roman historians, Polybius, Diodorus Siculus, Dionysius of Halicarnassus, Dion Cassius, Appian, Dionysius Eusebius, and others.

The 'Vaticana Collecta' was quickly followed by a similar collection in ten volumes, 8vo, '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 labours 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 were found to interfere with the demands of his official duties. 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 (1838) cardinal, at the same time with his friend and successor in the Vatican Library, Morsalfari; and soon afterwards was appointed to several important and coveted 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 for Catholic Education and Propaganda; and eventually the Council of Trent. In 1853 he was appointed to the still more congenial post of Librarian of the Roman Church.

This elevation did not interrupt in the slightest degree the literary labours in which he had been engaged. Scarcely was the collection of 'Classici Anecdoti' completed when he commenced a similar one, also in ten volumes, 8vo, 'Spicilegium Romanum' (1833-44), equally interesting and various in its contents, and a fourth collection entitled, 'Notitiae Christopholicae,' published in 1853 in six volumes 4to; but before he completed this, he was called to the duties of a far more extraordinary character, from the circumstance that it was compiled from the mere gleanings which had escaped the researches of the earlier editors and collectors. Several years before, he had undertaken to edit the well-known 'Codex Vaticanus' 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 prolegomena. He died however at Albano, September 8, 1854, in his seventy-third year, leaving this great work still unpublished; and it is much to be regretted that since his death no trace has been found among his papers of the long-expected dissertations which he had intended to prefix to the 'Codex Vaticanus.' It is conjectured either that, engaged by his other manifold editorial occupations, he deferred year after year this anxious and difficult task, or that, dissatisfied with the execution, he in the end destroyed what he had prepared.

Cardinal Mai's abilities as an editor were of the very highest order. While his collections comprise an infinite variety of matter of every age, of every country, of every variety of style, and of every important character, Greek and Latin, 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 capacity never fails. In his examination of problems, and difficulties, he often rises in assigning an anonymous manuscript to its true author, in collecting fragments of the same work and dovetailing them together into intelligible order, in selecting from a host 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 thousands of investigations which fall to the lot of a critical editor treading upon untrodden ground, he possessed a skill and acuteness which can hardly be equalled. It is easy to carry account of 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. Devoutly of the nature of a great humanist, and deeply imbued with a love for the literature for its own sake also, and he was ever foremost in every project for its advancement. He was a member of all the leading literary societies of Italy, and not unfrequently readers at the sessions of some of Rome assembled at all times liberal and indeed munificent; and at his death (reserving to the Vatican Library the right to purchase it at a moderate price) he bequeathed the proceeds of the sale of his noble library to be applied to the benefit of the poor of the city of Rome, and to the foundation of an endowed chair of Biblical studies, erected to his memory in the church of St. Anastasia, from which he derived his title as cardinal.

MAIANTHEMUM, a genus of Plants belonging to the natural order Apocynaceae. It has 4-parted petals, the segments horizontally patent or reflexed, deciduous; stamina 4; style 1; stigma blunt; berry 3-celled; cells 1-seeded.

M. bifolium has a stem with two alternate, stalked, triangular, cordate leaves; the stem is from 6 to 6 inches high; root fibrous; flowers very deep purple; spikes; flowers small; segments reflexed; berry yellow with brown spot. It is found in woods in the north of England.

MAIDENHEAD. [BERKSHIRE.]

MAGNÁS NEPOMŮK, an ingenious Hungarian poet and historian, was born at Pesth on the 15th of October 1776, and was the fourteenth child of a family of eighteen. He received an excellent education at Erlas and Raab, and his father, Count Joseph Mallath, an Austrian minister of state, induced him to enter into the same service, which he was compelled to relinquish after ten years, from increasing weakness of eye-sight. For two years he was forbidden to read and write, and it was during this time that he began to write his poems. The productions of his pen, in poetry and history are numerous. Many of his poems and one of his histories, that 'Of the Religious Dimensions in Hungary,' are in the Hungarian language; most of the others are in German. He translated with success into German the 'History of the Magus' (6 vols., 1828-31), and his 'History of the Austrian Empire' (6 vols., 1834-50), are the most important of his historical works: the latter contains the result of his investigations during a period of eighteen years. Since 1836, when he was chosen and held the office of a counsellor of the Hungarian Chancery and some others at Pesth, was a member of the Hungarian Conservative party, and in his history mentions his own name, along with that of the Magyars. The last of the only two magnates who opposed what he characterises as the violent and oppressive proceedings of the Magyars in forcing their language on the six million inhabitants of the country, whose languages were entirely different. The whole of his narrative of the conduct of the Kosnusz party in Hungary before the outbreak is deserving of attention, as a statement of one side of the question which is little known in England. The results to unfortunate Mallath were most disastrous. Deprived of the posts he held in Hungary by the revolution of 1848, he appears to have been unable to obtain a compensation from the Austrian Government. His literary labours did not prove remunerative, and his fortune gave way under the combined afflictions of poverty, exile, old age, and indigence. The old man, whose productions have earned him a permanent and honourable place in the literature of both Hungary and Germany, was driven by the pressure of extreme distress to drown himself in the Lake of Szenberg in Upper Bavaria, and with him his daughter, who had shared his misfortunes. The pathetic circumstance took place in the early part of January 1855.

MAINTENON. [Eure-et-Loir.]

MALACANTHUS [Labiades.]

MALACHARD. [Reducio Carbonis, Carbante, Carbonis, Carbonate of Copper, Monocarbonate.] Usually in incrustations, with a smooth tuberose botryoidal or stalactitic surface. Structure fine and fibrously fibrous; also earthy. Colour light green; streak paler. Usually nearly opaque. Crystals translucent to transparent, crystals of stalactitic, inclining to and thinning fibrous incrustations alkali, on a cross fracture. Early
varietie doll. 3.5 to 4. Specific Gravity, 4.
Composition:

- Carbonic Acid: 18
- Oxide of Copper: 70-9
- Water: 11-5

Dissolves with effervescence in nitric acid. Decrepitates and blackens before the blow-pipes, and becomes partly a black scoria. With borax it fuses to a deep green globule, and ultimately affords a bead of copper readily distinguished by its copper-green colour and its association with copper ore. It resembles a siliceous ore of copper, Chrysocolla, a common ore in the mines of the Mississippi valley; but it is distinguished by its complete solution and effervescence in nitric acid. The colourless variety is the bed not to be confused with Chryscolla. 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 Nischtagil, have afforded great quantities of this ore. A mass partly dissolved measured at top 9 feet by 18 feet; and the portion uncovered contained at least half a million pounds of pure Malachite. Other noted localities are Cheesy in France, Sandridge in Shetland, Schwers 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. Very large masses are occasionally formed in the stones in Russia, which are worked into slabs for tables, mantel-pieces, and vases, which are of exquisite beauty, owing to the delicate shadings and radiations of colour. In the Great Exhibition of 1861 there were magnificent specimens of this material in the shape of doors 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 are to be found in other European palaces. At Nischtagil, a block of Malachite was obtained weighing 40 tons. Malachite is sometimes passed off as turquoise, though easily distinguished by its shade of colour and much inferior hardness. It is a valuable ore when worked, but is too seldom smelted alone, because the metal is liable to escape with the liberated volatile ingredients, carbonic acid.

MALACHIUM, a genus of Plants belonging to the natural order Capparidaceae. It has 5 petals; 5 biff or entire petals; 10 stamens and 8 styles; the capsules opening with 5 biff valves.

* M. aquatilum, Water Chickweed, has a decumbent stem, angular, ascending, and covered with glandular hairs; corolate leaves, acuminate, seajile, the lowest one stalked; flowers solitary, the stem petals bipartite, rather exceeding the calyx; capsule exceeding the calyx. It is usually found in wet places in Great Britain.

MALICIOUS INJURIES TO PROPERTY. [Law, Cornw. S. 2.]

MALLARD. [Duck.]

MALLOW, MARSH. [Althaea.]

MALTHACITE. [Mineralogy, S. 1.]

MAN. In classifying the races of men, it must be remembered that the divisions and subdivisions which we 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 subordinate groups, which are called Classes, Families, or Orders, Genus, 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, the order Mammalia, the sub-order Hominidae, the genus Homo, and species sapiens. The characters of this species as given by Blumenbach have been stated elsewhere. [Man.]

The following 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 crisped.

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. Malayan.—Beard not so 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 crisp or curled.
7. Negrillo.—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 Arabian, and the hair, in like manner, straight or flowing.
9. Ethiopian.—The complexion and features intermediate between the Telingan and Negro, and the hair crisp.
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 men is Dr. K. G. Latham, who, in his work on the 'Varieties of Man in the British Isles,' gives a new system of classification, in which he designates the following:

In the first place, like Cuvier and other previous writers, he adopts but three primary varieties of the human species:

1. Mongoldia. II. Atlantidea. III. Japetidea.

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 departments of natural history. It must not, however, be supposed that by using these terms any of the varieties of man can be traced up to a common ancestry, so that we could say all the Mongoldia originated from this man, or all the Atlantidea with that man. In tracing back races we have no evidence so conclusive that any particular variety originated with a particular pair of human beings, as we have that all the families of mankind have originated in a single pair. The terms Mongoldia, Atlantidea, and Japetidea are not derived from a community of meaning in the things they express. Thus, the first comes from a nation, the Mongol, 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 Atlantidea are entirely found in Africa; hence their name. The Japetidea include the races of men in Europe, who are traditionally descended from Japheth; hence the name selected to express them.

I. Mongoldia.—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 tympanic 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 jaw 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 rarely still light-coloured.

The languages of the people belonging to this variety are either characterized by the absence of cases (apotic), or by having inflections expressed by 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, and finds its greatest development on the continent of Asia; though wherever it is found it is not to be entire possessor of the earth. The Persians of northern and western Persia, the Kurds, the Beloebhi, the Afghans, the Tajiks of Bokhara, and the Siaposh must all be regarded as
belonging to the Japytidae. On the other hand, although we shall find the Japytidae the principal occupants of Europe, there seems to be little doubt that the Lapps and Fins of Scandinavia, the Hungarians of Hungary, the Turks of Turkey, the Magyars or Esualdines of Biscay and Navarre, and probably even the Albanians or mountaineers of ancient Illyria and Epirus, all belong to the Mongolidae.

From the analogy of language this variety is made by Dr. Latham to include the whole order of the inhabitants of the Poleonides Islands, as well as those of America. Although at first sight the physical differences between the Asiatic Mongolidae and the inhabitants of the islands of the South Seas and the continent of America might look as great as those between Mongolidae and Japytidae, 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 vertically disposed nose, the small mouth, 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 Esquimaux 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 Esquimaux that we find a departure from the physical type of a peculiar American form, and a strong relation with the Mongolidae. It is considerations such as this which have induced recent ethnologists to regard the American Indian as a form of the variety of mankind to which the followers of Genghis-Khan belong.

The influence of the races included under the variety of Mongolidae 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 necessity, established some of the largest 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 Atlantidae and Japytidae, the first of which includes the Jews and the Mohammedans; and the last the Greeks, Romans, and modern European races.

The Mongolidae are divided by Dr. Latham into groups as follows:

A. Altica Mongolidae.—The term Altica is taken from the Altai Mountains in Central Asia, these being a convenient geognostic term for the different nations and tribes composing this division. It embraces two stocks, the Seriform, and the Turanian.

The Seriform stock has the physical conformation of the Mongol; and its languages are either wholly apotic or with only a few words distinctively Mongoloid in form. 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.

In this stock the chief peoples are Chinese, Tibetans, Annamites, Siamese, Khasi, Bengalees, and Indians; and several unplaced tribes are added by Dr. Latham.

The Turanian stock has the physical conformation of the Mongol; the languages are not monosyllabic. They are found from Kautocheka to Norway, 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, Ethiopia, and Lapland. They are distinguished as follows:

1. The Mongolian branch, including the Mongola proper, the Buriats, the Kamuks of Russia, and the Kinaf or Khinac of Persia.
2. The Tungusian branch including the Tchajpoh or the Lenas, the Lamuts on the Sea of Okhotak, and the Manchus or Chinese.
3. The Turk branch: this includes the Uighurs, the Turks of the Desert, Turks of Khoten, &c., the Kirghis, Uzbeks, Tadjiks, Turks of the Russian empire, and the isolated Yakuts of the Lena.
4. The Ugrian branch includes the Yapsas, the Permans, Tcherméis, Finlanders, Esthonians, Lakelanders, and Hungarians.

B. Dicranian Mongolidae.—The term Dicranian is taken from the ancient seaport Dicranas, and the tribes included in it have a modified Mongol organisation, the languages are (parasyllabic) 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 embrace the language of the Georgians 9, the Legiats 5, the Mistijit 4, the Iron; and 6, the Circassians.

Of this group, Dr. Latham observes, "To have used the word 'Caucasian' would have been correct, but inconvenient. It is already misspelled in another sense, that is, for the Mongolians. Yet for the race called Caucasian not only is 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 in such only, it is otherwise than out of place."

C. Oceanic Mongolidae.—The epithet Oceanic is applied to this group, because, with the exception of the peninsulas 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 Ocean, and the Japanese empire, 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. In the Indian Ocean this division is not to be found spread over these islands, but apparently nowhere else. "In the peninsula of Malaca," 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 exhibit two very distinct forms, one 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 short and curly. These are found in many different parts of the world, and the intellectual difference between these two classes is less 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—Melanesian.
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 umixed black—Negrito.
3. 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 Mongolidae.—The physical conformation of this section is that of undernourished Mongolians. They are called, by the Chinese, "a people not very different from the Mongolians," and are not only is this race to be found spread over these islands, but apparently nowhere else. 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:

E. Peninsular Mongolidae.—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 Mongol. Their languages are agglutinate, and the chief tribe occupies the north-eastern coast of Asia. The people emigrated in it are the Koreans, the Japanese, the Aino, the Koriak, and the Kamchadales.

F. American Mongolidae.—This section embraces the oceanic people of the whole continent of America. By most writers on ethnology, the races of America are regarded as a distinct family. Their connection with Mongolidae seems however to be established by the Eskimo, who are physically Mongol 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 turns upon the affinities of this family."
G. Indian Mongolida.—The races belonging to this section are found in Hindustan, Cashmire, Ceylon, the Maldives and Laccadives, and part of Beloochistan. They are found mixed or contiguous to the Japetidæ of Beloochistan and Cabul, and various Serifian tribes. They present two extreme forms of physical characters, one being dark or even black, the other of a brunette colour, with a skin of great delicacy and clearness. The social condition of castes prevails amongst them. The principal religions are Brahminism and Buddhism, with a variety of intermediate creeds. Their distinct language is in the Sanscrit, and their alphabets are derived from that language. They embrace the following divisions:—1, the Tamuli; 2, the Palinda; 3, the Brahî; 4, the Indo-Gangetic; 5, the Parbuttî; 6, the Cashmirean; 7, the Gînsâli; and 8, the Maldivian.

II. The ATLÂNTICA.—In their physical character the face is not so broad and flat as in the Mongolida. The jaws are thin, the profile are prognath, whilst the nose is generally flat, the forehead is retreating, the cranium dolicocephalic, 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 adopted by the Atlantean peoples are the same in the eight principal classes. They are seldom or never found with a truly amalga-mate infection.

The great district of the development of the nates which are brought together under the above definition, is Africa. Perhaps the greater part of all the inhabitants of the greater diversity of inhabitants than Africa, or races of men who at first sight appear so evidently distinct. All the ethnologists have placed the Hottentot, the Negro, and the Bushman in a variety Atlantea. The analogy of language has led to this conclusion; and the transition from the Bushman to the Hottentot 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 races but those of the Atlantea. The Syro-Arabian or Semitic nations, however, which are now classed amongst the Atlantea, are found occupying a considerable area in the southwestern part of Asia. The people of these races are far removed from the Negro and the Hottentot, though the 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 improvement produced by the negroes over the early civilization indicated by the Assyrian 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 that compound of Judaism and Christianity, Mohammedanism, has sprung up, and whatever inferior it may be to the Christian religion, there can be little doubt of the beneficial influence it has exerted on the races who have embraced it.

The following is Dr. Latham's division of this group:—

A. Negro Atlantea.—The negroes have a black, unctuous, and soft skin; the hair woolly; lips thick; maxillary profile prognath, frontal profile retreating; nasal depressed. They inhabit the mouths of the great rivers, chiefly the Senegal, Gambia, Niger, and Upper Nile. They are nearly limited to the tropic of Cancer. They are divided into Western Negroes, Central Negroes, and Eastern Negroes.

B. Kafr Atlantea.—The language of the Kafr supplies a broad distinction between these races and those of the Atlantea. 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, Easterns.
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 India, the Semitic races for 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 finally reached its last empire, the religion of the great Anglo-Saxon race, which on both sides of the Atlantic is increasing with extraordinary rapidity.

Dr. Latham divides the *Japetidae* into two divisions—Occidental and Indo-Germanic.

A. Occidental *Japetidae* include the races called Celts or Kelts. The Keltic languages were separated from the common mother-tongue subsequent to the evolution of the persons of verbs, but anterior to the evolution of the cases of nouns. These languages are evidently agglutinative. The present area of this race is Brittany, 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 Tarasici of the Tyrol, the Scordisci of Illyria, the Gitans of Asia Minor, the Celt-Iberians of Spain, and the Cimbri who lived in northern Germany, are generally termed Kelts. They have two types of complexity in the British Islands: the Silurian type having eyes and hair black, complexion dark with a reddish tinge, and chiefly found in South Wales; the Hibernian type having grey 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 Celts; &
   b. The Belgae, both extinct or incorporate.

2. British Celts, falling into—
   a. The Cambrians; &
   b. The Picts, which are extinct or incorporate.


4. The Celtiberians of northern Italy.

5. The Ligurians, extending from the Etruscan to the Iberian frontier.

Their line of population seems to have been from Celtic and Dunsirk to England, from England to Scotland, and from Scotland to Ireland.

B. Indo-Germanic *Japetidae*. The languages of this group were separated from the common mother-tongue subsequent to the evolution of the cases of nouns. They are less evidently agglutinative than the Keltic. This and the previous group are sometimes called Indo-European, and thus embracing all the *Japetidae*. The Indo-Germanic *Japetidae* further divide into two classes:

1. European Indo-Germans.—These are divided into:

1. The Goths—

a. The Tentons, which are again divided into:
   a. Magogoths.
   b. High Germans, including Hessians, Thuringians, Franks.

2. Low Germans, including:
   a. Batavians, embracing—
      * Saxons of Hanover, and Anglo-Saxons of England.*
      * Saxons of Osmund and Westphalia.*
      * Nordsalzburgians. Extinct.*

3. Frisians.

b. Scandinavians, embracing—
   a. Icelanders.
   b. Norwegians.
   c. Scandinavians.
   d. Swedes.
   e. Danes.

2. Sarmatians. This comprises the Lithuanian and Slavonic divisions, and these are its primary sections.

Of the Lithuanians Dr. Latham says—

1. Of all the *Japetidae* they preserved their original languages.

2. Of all the *Japetidae* they had the least influence on mankind.
MAN

3. Of all the Japetides they speak a language nearest in structure to the Sanscrit. The Slavonic division includes—
  a. Russians.
  b. Servians.
  c. Lithuanians.
  d. Tekebs.
  e. Poles.
  f. Serbs.
  g. Polavian Slavonians.

3. Mediterranean Indo-Germans. These include the Greeks and Romans of antiquity, and their modern descendents.

II. Iranian Indo-Germans. — Dr. Latham says "the whole of this class is hypothetical." It includes the Persians, who embrace the Kurds, the Balouchi, the Afghans, the Siaposh, and other contorted races in Asia. The unplaced stocks are the Armenians and Iberians.

(Or. R. G. Latham, Varieties of Man; Lawrence, Lectures on Man; Dr. Lankester, On the Physical History of Man, in Family Tutor; Nott and Gilchrist, Types of Mankind; Dr. Latham, Ethnology of British Colonies, Ethnology of British Islands, Migrations of Man, Ethnology of Europe; Dr. Pickering, Races of Man; Dr. Frichard, Physical History of Man.)

MAN, FOSSIL. [ANTHROPOLOGICAL, 2. 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 30th, 1765, and died at his residence Pedestal House, Somers Town, near Great Yarmouth, on November 18th, 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 barracks-master at Great Yarmouth. Here in February 1807 occurred the loss of the Sibbe 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 driven on shore that the coast was covered with dead and miserably wounded men on makeshift stretchers of raw timber, and seven dead bodies were cast upon a line of coast of 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 balloon; 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, in 1811, stout strips of raw timber closely platted, were found to answer, and on the 12th of February 1808, when the crew of the brig Elizabeth were in imminent danger, about one hundred and fifty yards from the beach, Captain Manby threw his shot at them from himself to the rigging with the shot breaking over them, 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 1810 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 by the friends of Lieutenant Bell of the Royal Artillery, who in 1798 had communicated to the Society of Arts a plan for throwing a rope from a mortar to a vessel itself, and to whom 60 guineas had been awarded after some experiments at Woolwich. 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 dangers yet to expect from shipwreck from Yarmouth to the Frith 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 of erecting such stations, and provided with the requisite apparatus. 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 at a certain height; and he suggested the use of shells, filled with a burning composition, to allow the crew to discover the flight of the ship, and to fire rockets by attaching a manufacture of ropes to prevent milder and rotting 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 for the purpose of testing a new form of 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 7000£ from the British nation, and the thanks of several nations 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 writs mandamus and absolute in certain cases in all the other Superior Courts of Law.

The proceeding by Prerogative Writ of Mandamus may be resorted to, as it has been 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 execution of public statutes, or compelling inferior courts 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 every case found of Prerogative Writ of Mandamus, the petitioners are passed for making railways, docks, bridges, improving towns, &c., &c., and, in almost all such 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 received much attention from lawyers; in the legislative act, 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 act which he is entitled to have demanded, and the claim must be repeated in the declaration, which must set forth the sufficient grounds for the claim, and show that the plaintiff is personally interested therein; that he sustains or may sustain a pecuniary loss by the non-performance of the duty demanded, and that performance of which is demanded; and that performance thereof 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 allowed, although at the 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 attached; or instead 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 amount of such expenses incurred be recovered by the court, who may order payment of the amount of such expenses and of the costs, and enforce payment thereof by execution.

MANGO-TREE. [MOONGATELA]

MANILOT. [JANIBHA, 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 (1797) 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 1826, and shortly afterwards commenced practice at law and took upon himself the guidance of the Manin family. However, he led a quiet domestic life, employing his leisure in historical and legal studies, and occasionally in writings of a kindred character. From the first however he shared fervently in the thoughts and the conversations of his own Austrian统治, 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 Zamboni, Count Cattaneo, Giovanni Maffei, and Francesco delle Antoni—the wrongs of his 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 brothers 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 conclusive manner, different from the ordinary eloquence of his countrymen. As on several important points, he and his friends, in the Congress of Vienna, came in collision with 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 whole peninsula was charged, broke forth in Milan; the news of the expulsion of the Austrians from Milan acted immediately on Venice, and on the 33rd 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 stepped forth 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 in the peninsula, then, divided, divided, divided; in 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 Piedmont, and form a new kingdom of Northern Italy. But the battle of Custozza having ended that dream, and restored Lombardy to the Austrian dominion, the Venetians again fell back upon their own resources and protested for a separate defence. The citadel of St. Mark was again hoisted; a triumvirate 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 Pergo, 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 broken and the French were defeated when entering Trieste, that the Austrians were thus free to reconquer all that still remained to be reconquered of 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 besides, with the exception of Rome. The two republics of Rome and Venice were the sole remains of the insurrectional work of the previous year; and against one of these the French were making the most formidable attack in the history of geology. But the other was not so much to the Austrians alone. Both republics behaved bravely. What Maximiz was to Rome, Manin was to Venice. From March 1849 he was inviolate with all the powers of the dictatorship. The defeat of Venice, confirmed by the treaty of Vienna, was gallant and obstinate in recent history. It 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.

MANTELL, GIDEON ALGERNON, a palaeontologist and geologist of extensive and varied acquirements, was born at Lewes, in Sussex, about 1790. For several years he practised as a medical man at Lewes, in a district which he regarded as one of the richest specimens of geological structure in Great Britain. He was a memorable instance of a man of genius, constantly and diligently occupied in discharging the duties of a laborious profession—in which he acquired great provincial reputation, especially in the methodical construction of his valuable geological works, and for the tenderness of his demeanour to his patients—nevertheless reaching great eminence as a man of science, and finding time to pursue his favourite studies with distinguished success. During his residence at Lewes he collected a vast number of interesting fossils, and formed a private museum, such as has rarely, if ever, been equalled. Here also he published his principal separate works, 'The Fossils of the South Downs,' and 'The Illustrations of the Geology of Sussex.' The former appeared in 1822, simultaneously with that of Cuvier and Bridges concerning the 'Mammalia.' The Geology of the Environs of Paris; and many of the organic remains of the chalk were described in both works simultaneously, though independently. Whilst at Lewes he also called attention to the remarks of Cuvier on the remains of fishes found in the chalk, and it was there he commenced the series of observations which placed him in a prominent position among British geologists. His attention was early directed to the phenomena exhibited by the ammonites, and he advanced theories, in many instances, that are now underlie the cretaceous system in the Weald district, happily designated by his friend Mr. P. J. Martin as the 'Wealden Formation.' His location being exceedingly favourable for researches in this considerable branch of the science, he became the original demonstrator of the fresh-water origin of the mass of Wealden beds, thus making a great step in British geology; and it is remarkable and instructive that this resulted from the direct application of the knowledge of existing causes and phenomena to the investigation of the past. Mantell's observation of the conditions under which existing fresh-water shells were imbedded in the alluvium of the valley of the Sussex Ouse, and even alternated with marine exuviae, suggested the probability of the occurrence of similar, but immensely more ancient, phenomena in the clays and sands of the Weald; and careful research fully confirmed his conjecture. His chief and very memorable palaeontological discoveries are connected with the Wealden. But the particular and locality and specific geological ology have been pursued in England for many years past, most of the larger reptiles of the period being discovered in the Wealden rocks. The geological view of the subject is from the impartial pen of Mr. William Hopkins, F.R.S., and forms a part of an obituary notice contained in his 'Anniversary Address' from the chair of the Geological Society, on the 18th of February 1853, on which the present article is founded.

Out of the Wealden, Mr. Hopkins states, Dr. Mantell "procured the most interesting of the relics of prodigious extinct reptiles, which owe to him their scientific appellation. Among these, I may name the wallower, the chief attractions of the great collection originally amassed by him, and now displayed in the galleries of the British Museum. Whether we regard his discovery and demonstration of the Iguanodon and its colossal allies in a geological point of view, as characterising distinct epochs of earth's history, or, with respect to their zoological value, as filling up great gaps in the series of Vertebrata, and elucidating the organisation of a lost order of reptiles, at once highest in its class, and most harmonious of form, in the history of the Mammalian type. Their characters were so peculiar, that the value and distinctness of their order there can be no question. Their ology has been elaborated with skill and care, and has worthily occupied the attention of the
most eminent anatomists. They give a feature to the herpe-
tology of the middle portion of the secondary epoch. Now,
of the five marked constituting this group, as at present
known, we owe the discovery of the variety and form
of—vix., Iguanodon, Hylaeosaurus, Pelorosaurus, and Reg-
osauros—to Dr. Mantell. Worthily then were the Wol-
kaston Medal and Fund adjudged to our lamented colleague in
the 'Iguanodon' having been followed by the 'County
Hill' and 'Queen's Head,' by Sir Charles Lyell, Edward
Wallace, Brayley, F.S.A. In the 'Bibliographia Zoologica et Geologica'
of Agassiz 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 many works of an antiquarian nature, and several
professional disquisitions.

MARBOU. [HERZOG.]
MARE. [HORSE.]
MARE'S [HORSE]. [HYPURR. S. I.]
MARECA. [DUCK.]
MARGARAMIDE. [CHEMICIST, S. I.]
MARGARIN. [TISSERAS, ORGANIC, S. I.]
MARIÈGOL. [CALCINÉ. S. I.]
MARET-BOSWORTH [NORTH.]
MARKET-HARBOURGH. [LEICESTERSHIRE.]
MARKET-RASEN, [LINCINGHORE.]
MARMOLITE. [MINERALOGY, S. I.]
MARQUESE LOUISE VIENIE DE, MARECHAL DUC DE RAGUSE, the son
of the Chevalier de Marmont, an old friend of distinction,
who was born at Châtillon-sur-Seine, on the 20th of July
1774. He entered the army as sub-lieutenant of infantry in
1789; but his father was killed in the battle of Jemmapes,
the 1st of November, 1792, to the Artillery School of Châlons.
Towards the end of that year he served in the campaign of
the Alps, under General Montesquiou. He was present at
the siege of Toulon, December 1793, and having been
appointed chief-d'escadron, he was sent to Italy, in 1796,
by the order brought by the treaty of Vendemarie (October 6,
1795), Marmont, having been appointed chief d'escadron,
was sent to Italy in March 1796, as principal aide-de-camp to
General Bonaparte. In this famous campaign he was present
almost everywhere; at Lodi, at Castiglione, and at the battle
of Saint-Maur, was chosen as his aide-de-camp, and made a captain
in 1794. In this capacity he accompanied his general to the
army of Italy, during the campaign of that year. After the great
sur-
render of 1796, at the battle of Vendemarie, General Marmont
was one of the seven officers selected to bear his company in his perilous
enterprise.

During the crossing of the Pyrenees and the spring of
1798, 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 selection of the personnel for 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 20, 1805; and he was next
successively employed in the reduction of the province of
Styria. Henceforth he commanded armies. In 1806 he
was sent to command the army in Dalmatia, where he acted
generally as recruiting agent. On May 27, 1808, with an army of 6000 men,
be defeated an allied corps of
9000 Montenegrins, Greeks, and other troops, sustained by
the second corps of 7000 Russians. During his occupation
of the duchy, Marmont carried out a beneficial system of public
works, including a grand line of railway, 210 miles in
length, for which useful improvement he received his title of
Duc de Raguse in 1808.
opened in 1809, Napoleon called this general to support his
main army. Marmont took the field with a corps of 3900
infantry, only 300 cavalry, and 12 pieces of cannon. With
this force he defeated the Austrian army, which numbered
several severely contested engagements; and then encounter-
ing General Gnyiay, at the head of 35,000 troops, posted on
the Drave, compelled that general to retreat into Hungary.
After these successes he joined Napoleon the day before the
great battle of Klosterman, on the 1st of July 1810, and
rejoined him at Vienna on the 10th. He placed himself in
front of the offensive action, and received his marshal's baton for his conduct in
that arduous engagement. This decisive victory being fol-
lowed by the treaty of Vienna, the Austrian government
made him the viceroy of Bohemia, the provinces of Ragu-
s, and Croatia, with other adjacent lands, which Napo-
leon 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 con-
tinued nearly sixteen months, giving proofs of superior
capacity as an administrator, whilst he was honourably dis-
tinguished from other marshals by his integrity and disinter-
estedness. Towards the close of 1810 he stood so high in
the esteem of his master, that he was sent into the peninsula
to supersede Marshal Massena in the command of the army
of Portugal. Though independent in his command, he hast-
tened to unite his army to that of Soult, placed himself
under the orders of that eminent leader, and assisted him in
relieving the garrison of Salamanca on the 22nd of July.
On the 22nd of July 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-
able. In the autumn of 1813, after the great battles of
tillers, Marshal, though scarcely recovered, took the command of
the second corps, and was present at Bautzten, 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
Schoenfeld, 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.
As commander in chief in 1813, he appeared 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 guns had begun to sweep the Boulevards within
the walls. Marmont, till the 11th, received the congradula-
tions of all his foes, after receiving a letter from Joseph Bonaparte authorising them to consider
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.
That night the French 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
Napoleon's baggage, baggage, and artillery, entered the
allied lines, and then marched to Versailles. It was this
step, taken without the sanction of Napoleon, which after-
wards drew upon him such odium.
The Duc de Ragueneau 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 revolution in 1830, he was charged with
the invidious 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 writing different countries, and in
writing works of considerable merit on the military systems of
Russia, Austria, and other states. Nearly twenty-two
years after his disgrace, he died at Venice, on the 2nd of
March, 1837, in his eighty-fourth year. The publication of
the 'Memoires du Duc de Ragueneau,' in 9 vols. 8vo, was
completed in 1857.
MARRAST, ARMAND, who succeeded Carrel as chief
editor of 'Le National,' was born in 1802, in the south of
France. He was educated for the church by the Jesuits of
Le Davy, he went to Paris in 1827, and immediately com-
missioned his career of politics by writing pamphlets against
the government. The pungency 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 of his time. His chief work, 'Les Hommes,
avid vivant,' was written in the French capital, a vivid contest being waged between
the practical school of philosophy, conducted by Lar-
miguere, and the eclectic school, presided over by Cousin.
Marrast entered the ranks of the former about six months
after the publication of the work, and speedily passed the
price by the light curriculity of his pleasant brochures towards Cousinism.
In 1830 Marrast established the newspaper 'La Tribune.'
It became the organ of the ultra-liberal party, and as such was supported by foreign as well as French
journals. It contained very bitter articles against the govern-
ment of Louis Philippe, and the fines to which it was
condemned, together with the law-expenses attending its
defence, put an end to its publication after a few years.
Armand Marrast, on one occasion, was called to
the Chamber of Deputies on account of two articles in 'La Tribune.'
On another occasion he was arrested and sent to
prison as one of the conspirators concerned in the 'complot
d'Avril.' He was soon released, and when he 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, where he nutured 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 he maintained to the end of his life, over his countrymen. He became sub-editor of 'Le National'
in 1834; and on the death of Carrel, July 24th, 1838, he
succeeded him as chief editor. From this time until the
revolution of February 1848, a period of nearly twelve years,
Marrast conducted that journal, which he had raised to its
high position it had acquired under Thierry, its first editor,
and then under Carrel.
During 1847, a series of exciting incidents rapidly followed
one another, throwing on Marmont and Mortier a
considerable accession of power. At one time, it was a course of ministerial prosecutions; at
another, rumours of bribery and corruption among men high in office; next, these rumours were succeeded by
flagrant 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 abolition of
Louis Philippe followed. Pending the crisis of events, Marmont came to the capital, became
a member of the new ministry; and deputations visited Marrast, and received their instructions from him. His name now was on every tongue; and when Lamartine was placed by the rapid
proceedings of his party at the head of the government, Marrast became secretary, afterwards maire de Paris, and
finally president of the National Assembly. This last office was limited by a new regulation to one month; but the
ubiquity of the new president, and his extraordinary influ-
ence over the 900 members in consequence of his tact
in 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
republican party soon found that Marrast was not advanced
enough for them; they began to stigmatise him as a moderate,
and his popularity fast declined. On the 15th of May 1848
the insurgents, headed by Barbeis and Blanqui, forced their
way into the Hotel-de-Ville, their first cry being 'Marrast! We
must make an end of that self-same-handed republic-
ian!' 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
that he still contributed to 'Le National' without any longer
being its editor, until the paper was suppressed by the
government of Louis Napoleon. He died on the 10th of
March 1863.
MARRAST. Provision is made for the licensing of
district chapels and churches for the celebration of marriage,
by the stat. 7 & 8 Vict. c. 56. The notice given to the Superi-
ior Registrar must now be accompanied by a solemn
charge, that he shall not permit his officiating brethren to
be admitted into the church or chapel, as the certificate of
marriage may be obtained. This is provided for by the statutes 19 & 20 Vict. c. 119, which
also enables parties who have entered into the con-

M.R.
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 marriage with any scruples which, after the merely civil form of the contract has been resorted to, may arise or be suggested to them. (Blackstone's 'Commentaries,' Mr. Kerr's ed., vol. 1, p. 464.)

MARRYAT, FREDERICK, was born in London on the 10th of April, 1792. He was an early and eager sporting loyalist. After being educated at various schools in and near London, young Marryat entered the naval service in September, 1806, as a midshipman on board the Impériéuse, 44 guns, commanded by the celebrated Lord Cochrane. 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 uncomplimentary terms on his premature exit from life. The reputation for gallantry and ability which he acquired under Lord Cochrane speedily recommendation with his higher commanders during three additional years of service as a midshipman. On four or five occasions he saved men from drowning by jumping overboard, at the risk of his own life. On one such occasion he saved the life of a son of William Cochrane, afterwards created a baronet. During his first two years he served as midshipman on board the Espigile sloop, whence he removed to the Newcast, sent under Lord George Stuart, to cruise off the American coast. He attained a commander's rank in 1815. In 1820 he commanded the Amazone, a man-of-war, which was changed into the Rosario, in which he brought home duplicate despatches announcing the death of Napoleon. After being employed for some time in the preventive service, he was appointed in March 1823 to the Lorme, 18 guns, and proceeded to the East Indies. He was senior naval officer in the attack on Rangoon, and in December 1824 he accompanied Sir Robert Sale in the expedition up the Bassein River. His good services in the East Indies procured him the thanks of the East India Company and general promotion. In June 1825 he received the decoration of C.B., and at the same time the Royal Humane Society awarded him its medal for having saved so many lives from drowning. From November 1825 to November 1830 he commanded the Arrisc, in which he made another voyage to the East Indies. There, about the year 1828, when he was approaching his fortieth year, that he began his career as a novelist by the publication of his 'Frank Mildmay.' This was followed at brief intervals during the next sixteen years by his other well-known writings, most of them novels of sea-life—'Peter Simple,' 'James Faithful,' 'Japhet in Search of a Father,' 'The King's Own,' 'Mr. Midshipman Easy,' 'Newton Forster,' 'The Pacha of Many Tales,' 'Rattlin the Reeler,' 'Snarly-yow, or the Dog-Fiend,' 'The Fishermen of the New Forest,' 'His Banner in Battle,' 'The Pirate and Three Cutters,' 'The Phantom Ship,' 'Poor Jack,' 'The Poacher,' 'Masterman Ready,' 'Pericival Keene,' 'The Narrative of Monsieur Violet in California, &c., 'The Settlers in Canada,' 'The Mission, or Scenes in Africa,' 'The Prisoner's Man,' and 'Valérie.' The merits of these works as amusing works of adventure and description are universally known. Besides these, he published in 1837 a work of a different class, 'A Code of Signals for the use of vessels employed in the coasting trade of the United States and the British government, and is now in general use by our own and all foreign navies, and which procured him the cross of the Legion of Honour from Louis Philippe. He also published in 1839 in two series of three volumes each, 'A Diary in America,' which he dedicated to Sir Stephen Sharp, once charged with affairs of State in Russia, he had six children. Of two of his sons who had entered the navy, one perished, before his father's death, in the Avenger steamer; one of his daughters has since appeared and another is a novelist. Captain Marryat was a Fellow of the Royal Society.

MARS, ANNE-FRANCOISE-HYPOLITE BOUTET, known as MADEMOISELLE MARS, was born in Paris on the 23rd of September, 1778; her father being the actor Monvel of the Théâtre de la Monnaie; her mother a very pretty actress named Mars-Boutet. She appeared before she was ten years old in juvenile parts, and in 1773 she already filled at the Théâtre Feydeau, what on the French stage are called 'les rôles d'ingénue.' She met with a general patronage at 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 Mademoiselles Méfray and Lange in 1778. She was then twenty years old. She acquired her fame by her talent, her fine taste for elegant projection, her grace and her ease in the public at all times what she would become. It was not until 1803 that her first marked success had been obtained. In that year the part of a dead and dumb pupil of the Abbé de l'Épée, in the piece of name having been assigned to her by the author, became by her talent 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 leave of the stage in 1809, leaving the inheritance of her 'réciters' to be divided between Madeemoiselle Mars and Mademoiselle Levard, which gave rise to a long contest between the rival stars. The former however soon distanced the latter completely, and she acquired such fame as 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 Dumars's drama, which she played for the first time on the 2nd of April, 1839, when she had passed the age of three-score.

Yet, 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 romantics, and preserved the excellencies of her own parts. Victor Hugo and the elder Dumas were sometimes embittered by her criticisms and strictures, and the latter, in his 'Mémoires,' has described some piquant disputes of this nature between the actress and the dramatist. She had a decided individuality, but her grace, her wit, and especially the manner in which she could breathe life into 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 Dumars's drama, which she played for the first time on the 2nd of April, 1839, when she had passed the age of three-score.

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died on the 20th 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 60,000 guineas.

MARSHALSEA. 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 been before the object of animadversion by writers in pamphlets, and the long delay, hitherto, had amounted, amounted to no more than the universal complaint of the costs incident to legal proceedings. The Palace Court had not long before been reputed by Royal Commissioners to be one of the best in the metropolis.

MARSILICEAE, or RHIZOCARPÆAE, Pepperworts or Rhizocarps, a natural order of Aquatic Plants, with creeping stems bearing leaves, which are usually divided into three or more segments, and are often floating. The flowers are small and greenish. The rootstock is produced at the base of the leaf-stalks, and consists of sporocarps and involucres inclosing clustered organs, which consist of antheridian and pistillidan cells. The germinating body has an oval form, and occasionally a mamilla 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 Asia, Africa, America, chiefly however in temperate latitudes. Their position is well described by Lycojodioae and Lycojodineae. The species number about 20, the principal of which are—Pulicaria, Marsilea, Acis, and Salvinia. (Balfour, Class-Book of Botany.)

MARTIN, John, or Martin, was born at a house called the Eastland Ends, Haydon Bridge, near Hexham, Northumberland, on the 19th of July, 1859. 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 indolence having been canceled, he was sent back to school with the help of an Italian painter named Bonifacio Musso, the father of Charles Musso, who acquired some distinction as an easel painter. With him young Martin removed to London in September, 1860, 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 Athenæum (see Ath. for 1864, p. 246, to which we are indebted for the leading facts contained in this notice), “at this time, by close application to his studies, I began to draw; in the depth of the long winter, I obtained that knowledge of perspective and architecture which has since been so valuable to me. I was, at this time, during the day employed by Mr. C. Musso’s firm painting upon cloth and glass; by which, and making watercolour drawings and perspective, he made his way. The life I led in fashionable society was a struggle for an artist’s life when I married, which I did at nineteen.”

His marriage stimulated him to bolder course. He determined to paint a large picture, and by a mouth’s application produced in 1812 his first work, ‘Sadak 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.” It was a must make an easy enough decision; once 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 50 guineas, in Mr. Manning, a bank director. He followed up his success by sending to the British Institution an ‘Exposition from Paradise,’ and to the Academy in 1814 ‘Clytie,’ a work which hung in the ante-room, as well as in the main room, and more ambitious picture, ‘Joshua commanding the Sun to stand still in the Leaving of Jericho,’ which, as in the first instance, was exhibited the following spring, it was placed in a post of honour, and awarded the prize. Martin was excessively angry with the Academy for not being allowed to take his grand picture in the same breath and the breach was never healed: he removed his name from the Academy’s 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 1818 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 Babylon,’ which was second in value of all my productions. Its exhibition excited the attention it excited. The following year came ‘Macbeth,’ one of my most successful landscapes; and then, in 1821, ‘Belshazzar’s Feast,’ an elaborate picture, which occupied a year; and I received the premium 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 best to ignore the opposition. The ‘Belshazzar’ was swelling with success, 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 “sublime style” as a subject of conversation. Martin was slow to follow up his success: “The Destruction of Heroden came in 1822; the ‘Seraphim’ and the ‘Paphian Bower;’ 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 resorted to his brush it was not so often on a large scale. His later 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 of his life with as much zeal as was necessary to captivate the public eye. Thus during the last twelve or fourteen years of his life he painted—‘The Death of Moses,’ and ‘The Death of Jacob,’ 1838; ‘The Eve of the Deluge,’ ‘The Ascenting of the Waters,’ 1840; ‘The Conquest of City and River of Babylon,’ and ‘Pandemonium,’ 1841; ‘Flight into Egypt,’ 1843; ‘Christ stilling the Tempest,’ and ‘Canute the Great: breaking his Courtiers,’ 1843; ‘Morning,’ and ‘Evening,’ 1844; ‘The Judgment of Adam and Eve,’ and ‘The Fall of Man,’ 1845—lively and picturesque visions, and ‘Zéglé in the Happy Valley,’ 1849; ‘The Last Man,’ 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’ (1859). 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. He had recourse to no means to hasten his work. He lived in the hope of improving his health to Jouglass, Isle of Man, where, 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 Strang Road, a few miles from Douglas, and on the 17th of September there was performed his funeral service in the church of St. Martin’s, Wirral, and ‘The Plains of Wrath,’ and ‘The Plains 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 infinities of age, with mind and body both enfeebled, they are comparative failures, having all the worst faults and manerisms of the painter’s earlier pictures, and only few of their redeeming excellences.

Martin was an 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 worn out, the conception of the sublime was unimpressive, this was unquestionably the case; and the unparalleled popularity of his early pictures, while the manner was new, can be readily understood.

Martin died on the 28th of August, 1854, in his fifty-seventh year. He was a small man, with a very red face and a capital laugh; bear often repeating; and he kept on covering acres of canvases with interminable vistas of buildings, pile upon pile, as buildings novel could have existed in reality, and crowding the roads and fields with myriads of little insignificant figures, all treading down the whole in their progress through a twilight, with flashes of jagged lightning or streams of dazzling sunshine; never advancing beyond a harsh and niggling touch, or attaining to anything better than a crude and conventional system of colour. Seeing but two, or at most three, of his pictures, he might be pronounced a man of
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genius; seeing all, while acknowledging his talent, it is difficult not to feel surprise at his deficiencies of taste, observation, 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 1826 his ideas had taken a definite shape, and he gave them to the public in a 'Plan for supplying with pure water the Cities of London and Westminster, and improving the western end of the metropolis,' and he continued over the north of the United Kingdom, up to the time of his death. The following is his own account of his labours in this line, contained in his contribution to the 'Athenaeum' already referred to: 'My attention was first occupied in endeavouring to procure an improved supply of pure water for the inhabitants of the metropolis, and in rendering it available as manure; and in 1817 and 1826 I published plans for the purpose. In 1839 I published further plans for accomplishing the same objects by different means, namely, a weir across the Thames, and for draining the marshy lands, &c., &c. In 1835, 1836, 1838, 1842, 1843, 1845, and 1847, I published and republished additional particulars, being so bent upon my object that I was determined never to abandon it, and though I have reapplied no other objects, and now, of course, coal mines, floating Harbour and Pier; iron ship, and various other inventions of comparatively minor importance, all conducing to the great end of improving the health of the country, increasing the produce of the land, and furnishing employment for the poorer part of the community.' He also took out patents for water and sewer-pipes, &c.

Besides his great pictures, Mr. Martin painted a great number of water-colour landscapes, very elaborately wrought out; he also made some drawings for books, including 'Paradise Lost,' and 'Paradise Regained,' the 'Pilgrim's Progress,' &c., for which he received large sums, but which, though popular in their day, now seem for the most part strangely insignificant as illustrations. For the Millon illustrations he is responsible for most of the work of 1805.

MARTINSIDE, 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 Haslum. (Dana, Mineralogy.)

MARTOK. [SOMERSETSHIRE.]

MARYSVILLE. [CALIFORNIA, S. 2.]

MASHAM. [YORKSHIRE.]

MASHICUT. [LEAD.]

MATERIA MEDICA. [THERAPEUTICA, S. 3.]

MATHIEU, 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 mother was young, and Theobald was enabled by the kindness of the Countesses of Llandaff and Lady Elizabeth Mathew, to proceed to the academy of Kilkenny, and afterwards 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 a missionary charge in Cork, 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 dispensation from the prohibition against ordaining a bishop, which Father Mathew conferred upon 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 Poor-Law Commissioners in 1834. 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 himself heart and soul to the peaceful agitation, he had the satisfaction to see within a few months no less than 160,000 converts in Cork alone. Extending his sphere of action he commenced a 'progress' through the west of Ireland, where poor and destitute results were seen; wherever he went the crowds that flocked to 'Father Mathew' to take the pledge of temperance were so numerous, that they could only be kept in control by the military and police. The same results followed in all the towns which he visited in the west of Ireland, at Dublin, at Cork, at Limerick, and at Ennis, and in Liverpool, Manchester, and London, where, regardless of creed and country, he went about doing good, and raising the squalid objects of pity and compassion to self-respect, independence, and industry. It ought to be noticed, that these visits were voluntary, and that he did not scruple to sacrifice his temporal prospects; a distillery in the south of Ireland which belonged to his brother, and formerly provided him with almost all his income, being cut up in consequence of his preaching against the use of ardent spirits. His services in the cause of morality and religion having been recognised by statesmen of all shades of opinion, her Majesty granted to Father Mathew out of the civil list an annuity of 300/. a year—a sum, though small in comparison to his labours, but sufficient to keep up the payments on policies of assurance upon his life obtained for the sake of securing his creditors; and a private subscription was entered upon for his assistance. He died on the 8th of December 1856: having from the state of his health been for some years incapacitated for active labours.

MAYACACEE, Mayaca, a natural order of Endogenous moss-like Plants, creeping over damp places, with narrow leaves, resembling Spider-Wort, but differing in the 1-cell'd anthers, carpels opposite the inner divisions of the perianth, 1-cell'd ovary and capsule, and parietal placenta. The species, four in number, are natives of North America. They are of no known use. (Balfour, Class-Book of Botany.)

MAYO, HERBERT, M.D., a distinguished medical writer, whose works on Physiology, although now to some extent superseded, were in considerable advance of his time. The first by which he made himself, but differing in the 1-cell'd anthers, carpels opposite the inner divisions of the perianth, 1-cell'd ovary and capsule, and parietal placenta. The species, four in number, are natives of North America. They are of no known use. (Balfour, Class-Book of Botany.)

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Sepsis in Hindustan. From Meenur the mutineers marched
direct to the city of Delhi, where they were joined by
others. The aged nominal King of Delhi was pro-
claimed Emperor.
MEHMET ALI, Pasha of Egypt, was born in the town
of Cavaillé, in Roum-lí, about the year 1799. He began
life as the keeper of a small town; but having
volunteered into the army, he gained the government of
the governor of Candia by his zeal in suppressing a rebellion
of the pirates of that island. In 1799 he headed a contingent
of 300 Candian soldiers in an expedition to Egypt, where he
counts his success with the force of the native religion of
the French. Here he laid the foundation of his military renom-
and of his political ascendency. On the evacuation of Egypt
by the troops of the Emperor Napoleon I., the Sultan nomi-
nated, as viceroy of Egypt, Mohammed Khoren; but the
Mamelukes, in rising to assert their ancient rights and
influence, of which they had been deprived during the
occupation of their country by the French, chose Mehemet
Ali as their viceroy. In 1800 he was made Pasha of Cairo,
in which the following year was added the Pashalik 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. There are numberless instances of his excesses
through the country: an end was thus put to a turbulent
and formidable race which had kept Egypt in a state of
anarchy and war for upwards of 400 years. After
the destruction of the Mamelukes, Mehemet Ali made himself
master of Egypt, which he held with an iron hand.
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_currant, where he and the Mamelukes
were defeated, but had pillaged the holy cities 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
rebelling nation; but his fleet in 1824, under Lalla
Moras, in the summer of 1824, 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 pleading as an excuse his desire to recover pos-
session of some Egyptians who had settled in that country,
he invaded Syria, with a large army under Ibrahim Pasha,
and obtained a commission to govern the same, which was
an integral part of the Ottoman Empire; but 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 [Manuwa II.] by the interference of the
Porte in 1833. Syria was annexed to the Ottoman Empire
by Mehemet Ali on his acknowledging himself a vassal of the Porte.
He remained in quiet possession of Syria as well as Egypt until
1839, when his nominal master, the Sultan, jealous and
weary of the way 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 Pashalik of Egypt being made
hereditary in his family. He continued to administer the
affairs of the country until September 1845, when he resigned
the reins of government into the hands of his son Ibrahim
Pasha, on whose death they passed to Abbas Pasha his
great-nephew. Mehemet Ali himself lived only a few months
after these changes, as he died August 2, 1840, at the age of
about eighty years. By his wives and concubines he had
sixteen children; two of his sons he sent to Paris for the
sake of education. He was buried at Cairo with great pomp
and honour.
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 expressive, and very ambitious, yet particularly sensitive to the opinions 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
Mohammedan states of the East. He established order, 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
administration of the law and his government of the country.
He introduced justice with
vigor, and such a wise and just measure, 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 recourse to a
heavy revenue, taxation, and for his army to an enormous con-
scription.
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 introduced into 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
sail up the Tigris and down the Euphrates without being
stopped by the Tartars 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
justice and settled principle than exists at the present time in
any part of the world. His internal administration, his
laws, and even his costume, awakened that beneficial spirit of industry which for many a long century 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 being carried to the northern ports of his dominions, in factories erected
for that purpose at his expense. At the same time he gave
he great impetus to the cultivation of silk in Syria by the
plantation of mulberry-trees on an extensive scale. He
founded a system of national education, of which no one for
centuries past had conceived the idea in the East, and he
devised immense sums to that purpose. In fact he projected
and founded more useful institutions than any Egyptian
ruler since the days of Saladin. In addition to this, though
he provided for his own safety without a ship or a drifted and disciplined soldier, he found means 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 learnt to read in his thirty-fifth year, and who often,
in the words of the poet, "went without art or learning", to
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.

MELAMINE. [CHEMISTRY, &c.]

MELAMPYRINE. [CHEMISTRY, &c.]

MELANOSPERMEÆ, or FUCALES (Harvey), the first
sub-class of the class Algae. It consists of plants of an
olive-green or olive-brown colour. Phycitisation monocious or
dioicious; spores olive-coloured, either external, or contained
singly, or in groups, in proper conceptacles, each spore
enveloped in a transparent skin (perispore), simple, or
finally separating into several spores; antheridia, or trans-
parent cells, filled with orange-coloured vivacious corpuscles,
moving by means of vibratile cilia. It includes the follow-
ing orders:

Phaeahæ.—Spores contained in spherical cavities immersed in the frond. [Fucaceæ.]

Sporocistisæ.—Spores attached to external jointed flan-
ments, which are either free or compacted together in knob-
like masses.

Laminæsæ.—Spores forming indefinite cloud-like
patches, or covering the whole surface of the frond.

Dictyonæsæ.—Spores forming definite groups (sori) on the
surface of the frond.

Chondriæsæ.—Frond cartilaginous or gelatinous, con-
posed of vertical and horizontal filaments interlaced together.
Spores immersed.
The Orthidea—
1. Clytea.
2. Collecta.
3. Eucnemis.

MELITTHS, a genus of plants belonging to the natural order Labiata. It has anthriscus 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 long and broad. M. Melittisphyllum, Basset Balm, has oblong, ovate, or slightly cordate leaves. The upper lip of the calyx with 2 or 3 teeth; flowers purple, with a white margin, or variegated of different sizes, large. Brem 1 or 2 feet high. M. grandiflora (Smith) is the largest variety. They are both found in woods in the south of England.

MELKSHAM. [Wiltshire.]

MELOSIRENE, a family of Distosieae, formed by Kützing. The species are ston. not having a central opening on the secondary side. The stamens are interrupted in the median line. It includes the genera Galioneola, Melosira, Potosira, and others. Meneghini, in his "Natural History of Distosieae," makes the following critical remarks on this group:

"The Melosira in general may be regarded as polyplorphic associations of Cyclorella, and the comparison precludes principally in the second sub-genus. The distinction of the two sub-genus is also proposed by Hassall (Spergularia, Melosira) in the Sphaerastrum, but it is a species flora flat at Point Gellibrand, on the west side of Hobson's Bay, about 8 miles S.W. from the city. It contains some good houses. A railway connects Williamstown with Melbourne city. By means of a pier at Williamstown, having a communication with the railway termini, passengers and goods may be landed and sent to Melbourne.

MELDRUM. [Aberdeenhire. S.]

MELILLA, a sea-port town of Marbella belonging to Spain, is situated 11 miles S. from Cape Ras-ad-Dir, or Tres-Focos, in 36° 15' N. lat., 6° 25' 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 improvement on the land side, and towards the sea, it is defend by strong ramparts. The fortress has large magazines and citernes, and small vessels can enter the harbour. The presidios of Peñon-de-Velez and Alhucemas, or Alhucemas, two strongly fortified rocky islands between Cape Tres-Focos and Melilla, are also under the same title. 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.

MELISSAC Acid. [Chemist. S. 2.]

MELISSACE. [Chemist. S. 2.]

MELITTA (Kirby), a name for a genus of Insects belonging to the order Hymenoptera, and to the tribe Melitfera of Latreille. 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 Melitifer into two families, Andreienis and Chrysidia.

The Andreienis include the following genera:

1. Coleopta.
2. Porphria.
3. Pseudepida.
4. Pseudepida.
5. Hylitusa.
6. Hylitusa.
7. Pseudepida.
8. Pseudepida.
11. Hylitusa.
13. Hylitusa.

During desiccation it happens in the marine species, as in the _Podostrea_ already described, that the internal substance adheres to the inner wall in the form of oily globules surrounding the spermatangial or carpogonial margin, and compresses one against another in the form of regular polygons. Ehrenberg also speaks of diaphanous vascular spaces, which he regards as stomachs. Küttning enumerates, figures, and describes nineteen species, marine, freshwater, and fossil, between which he places one genus at the end, and a famous _Ferruginea_ (M. ocrasiera, Rafs), which he proves not to belong to the class of _Diatoameae._

We shall find, as a character common to them all, the circular figure of the vertical section parallel to the lateral surfaces; a character which, as well as the other, of a radiated disposition of the striæ upon the lateral surfaces, we shall find repeated in the family of _Cocceidioætes_, which, having the shield of a cellular structure, belong to the tribe of fungi to be constantly regarded so the _Melostrea_ (endota, decussata, irrigata), 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 _Melostrea_ the development of the lateral surfaces prevails over that of the primary ones, which we find finally to disappear in certain genera (_Podostrea_, _Cocceidioætes_), as well as in some species of _Melostrea_ (varria, orichalcea), the increased length of the axis, and the concave or convex condition of the primary surfaces: and it is to be observed, that although in this 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 former groups, only the presence of longitudinal furrows or canals. The separation of one lateral surface or valve from the other, with the consequent dilatation of supericies, which the primary surfaces exhibit before the duplication takes places (though verified to some degree in other genera, yet in the _Melostrea_ better than elsewhere), presents an undeniable analogy with the reduplication of _Demeisadæta_, which Brébisson distinguishes from the deduplication of _Diatoameae_. The particular disposition of the internal radial or mural canals, determining the section of the centre, the arrangement of some articulations, and the dilatation of the interstitial ring, are isolated facts, which however merit particular attention in the paeony of our knowledge.

**MENACANITE.** [Titanium.]

**MENETHIUS.** [Maiden.]

**MENDELSOHN,** _Felix Mendelssohn-Bartholdy_, one of the greatest musicians of the present century, was born at Berlin, 3rd of December 1809; he was the grandson of the celebrated Moses Mendelssohn. His father, who was the head of a great banking-house, on his marriage adopted the name of his wife's family in order to belong to his own. He had embraced the Lutheran faith, in which he continued to die. When Felix was in his infancy, his father removed from Hamburgh 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 affections of Goethe, who was a friend of the family; and the published letters that anonstrous man contain 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, in which he retained unimpaired to the end of his short life.

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 anything he could speak. He was 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 work, which was published, was in advance of anything produced by Mozart at an age equally tender. His three quartets for the pianoforte, violin, and violincello, written before he was twelve years old, are not merely surprising juvenile compositions, but masterly works, which continue to 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, and the public always took a part of the interest of this more popular character. It was favourably received; but, as it betrayed some inexpediency 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 is one of the most charming, but full of the dramatic element. Every personage speaks in his own characteristic language, from the solemn pomp of Don Quixote and the grotesque humour of Sancho, to the grand narrative of the love of the hero, and the wedding and its crosses form the subject of Cervantes' delightful story. This most interesting piece shows what great things Mendelssohn might have done for the music of the stage, had he not left this branch of his art to tread the highest of all—that in which he followed, and with a still greater distance, the footsteps of Handel. Another proof of the dramatic character of his genius at that early age was the composition of the overture to 'The Midsummer Night's Dream,' which breathes in every bar Shakespeare's own inspiration. Its popularity has now become unbounded: and no listener can fail to trace in its passages, in which the fanciful, the delicate, and the grotesque are so exquisitely blended, the various conceptions of the poet. The rest of his works was written till many years afterwards, for the purpose of accompanying the performance of the play at Berlin. Its effect, thus introduced, was found to be so delightful, that in Germany the play is never represented without it, and the same effect has been produced in England.

Mendelssohn had just reached his twentieth year when he made his first visit to England; a visit which deeply influenced the course of his life. He arrived in London in the autumn of 1828. The day was dis remembered that he and his family were received at our most eminent musicians, by whom he was cordially received. At the first concert after his arrival of the Philharmonic Society, his overture to 'The Midsummer Night's Dream' was performed, and received with enthusiasm by an audience not improperly composed of those who could never have heard of him. It was immediately published. In a little memoir of his life, published a few years ago by Mr. Benedict, the eminent German musician so long resident among us, there are some valuable reminiscences on his London début. "The effect," says Mr. Benedict, "of the first performance of the overture to 'The Midsummer Night's Dream' in London was electrical. All at once, and perhaps even when least expected, the great gap left by the death of Beethoven seemed likely to be filled by the presence of another genius in the world; in 1828." That was the birth of the much underrated taste of the English public, and its discernment in appreciating and even discovering new-born musical talent. Not to speak of the Elizabethan era—of Orlando Lasso, Luca Marenzio, the great madrigal writers—there was a generation of Englishmen who could never have heard of him; and it was not until he came to perform in England and for an English audience! Were not Haydn's finest symphonies written to gratify the London amateurs before a note of them was heard or known in Germany or France! Was not Beethoven known and revered by English artists, by English musical societies, when almost forsaken and neglected in Germany! And so it was with Mendelssohn. His renown, after the enthusiastic but just reports of his reception in London, both as a composer and pianist, spread to those who were all the Europe, and gave the young and ardent maestro a new stimulus to proceed on this glorious path.

In the same year Mendelssohn visited Scotland. In Edin-}

burgh he was warmly welcomed by a literary and musical society, able to appreciate his genius and achievements, and his stay in that city was always regarded by him as one of the most agreeable incidents of his life. He afterwards made an extensive tour through the Highlands and the Western islands, receiving everywhere the highest adulation. His excursions of the days spent in Scotland are to be found in his writings. He was deeply impressed with the wild and romantic beauty of the old Caledonian music, even in its rudest and most primitive form, and especially admired the Highland bagpipe and those strange instruments which receive their name from "polo," and scarcely allowed by dainty connoisseurs to deserve the name of music, yet reach the heart of every true Scotman. Such music Mendelssohn could understand and value. A Scottish friend carried him to witness the "Competition of Pipers," as it is called, a gathering of masters of
the national instrument, who are chiefly retainers of great
families, and assemble annually in the Edinburgh theatre to
counterbalance the Sacred Harps. The most brilliant com-
petitor 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 the admiration and the enthusiasm of the
congregation, and 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 the presence of the composer, and
his first 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 in a country of his own; and therefrom England became, as it were, his adopted
country, and was associated with the most important circum-
stances of his artistic life. His treatment at that time by
his own countrymen appears to have inspired him with dif-
fidence; for, as he says, 'My name became a household
word' in Germany, and men ran away from one another
saying, that "the mean 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,
and settle in London, for the sake of being free from
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.

His entrance 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 20th of September 1837, was an event
memorable for the wonderful upsurge of the musical
feeling which it showed. The whole town was in a ferment
up with the unrivalled magnificence for which the musical
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 the instrument by which this successful event was
achieved; for "The 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 them 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
resolved to return to Berlin, and gave up every other occu-
pation, 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 was also adapted to the music with admirable
skill by Mr. Bartholomew. 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 as white and as grand in voice, as to
be not only the masterpiece of the composer, 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. It was not performed there, and afterwards, under his own direction, at
Birmingham and Manchester. Soon afterwards he left England,
ever to return. His health had for some time been declin-
ing. Shortly after his arrival at home, he received a shock
which lay him low for the summer. When he recovered, he
was not the same man. He had changed 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
isolation of his own house, he renewed his strength and returned
home to Leipzig, morally 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 thirty-ninth year. He left many manuscripts
of compositions, which are understood, 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 'Christus,' 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 contributions to our musical life. They are
so many, so varied, and so allied to the very life of the
brave every branch of his art; but it was in sacred music
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 mind and blameless
life, few men have had a more enviable lot than Felix Men-
delssohn.

MENDLESHAM. [Some text]

MENILITE. [Opal.]
MENISPERMINE. [Chemistry, S. 2.]
MENY. [Bacterium anthracis, S. 2.]
MERCANTILE MARINE. [Shire, S. 2.]
MERCHANT-SHIPPING. [Shire, S. 2.]
MERE. [Wiltshire.]
MEMLANGUS, a genus of Fishes belonging to the family
Gadidae. It is distinguished from the genus Morhua, to
which the Cod-Fish belong, by the absence of the barbule
at the chin. [Mormula.]
M. vulgaris (Gadus vulgaris, Linnaeus), the Whiting.

This fish is so well known as to require little or no
description. It is distinguished by its dark coloration, and
its flesh. The pearly whiteness of its flaky muscles, added to
its extreme lightness as an article of food, recommend it
particularly to invalids as an article of diet. It is caught in
great abundance all round our coast, and may be traced
from the Shetland Islands to the Dogger Bank. It is a voracious
feeder, and seizes indiscriminately Molluscs, worms, small
Crustacea, and young Fishes. Though occasionally occurring
in the London market of three or four pounds weight, the
most usual size is from 16 to 16 inches in length, and weigh-
ing about one pound and a half. The body of the Whiting,
like the body of those belonging to this division, is longer
for its depth than that of the Cod-Fish; the scales small,
oral, and deciduous; the lateral line dark and straight pos-
teriorly, but rising gradually throughout the anterior half;
the head elongated; the mouth and gape large, the tongue
thread-like; the caudal fin small, and the other fins, pink
above the lateral line pale reddish-brown; sides and
belly silvery white; pectoral, caudal, and dorsal fins pale
brown; ventral and anal fins almost white, the pectoral fins
each with a decided black patch at the base and the black
above the lateral line pale reddish-brown. [M. adunus (Gadus adunus, Risso), Couch's Whiting.]

It is mentioned by M. Riss, in his volume on the 'Ichthyology of
Nice,' published in 1810, but was not caught in the British seas until 1840 by Mr. Crouch. His description is as follows: "a straight line 3½ inches; from the base of the dorsal fin to the vent along the curve, 3 inches; from the mouth to the edge of the gill-covers 3 inches; from the same to the anterior edge of the eye one inch; the eye large, the form a perpendicular oval; under jaw longest; the teeth very small, the snout receding from it backward, contrary to the form of the Whiting, in which the upper jaw is under a projection. The general form of the body resembles that of the Whiting, but rather more slender; the back rounded as if the specimen was tender, likely to be a result of emaciation. The distinctions between this fish and the Whiting are obvious, in the fins, fins, lateral line, colour, and vertebrae."

Catus carbonarius (Linnæus), 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 Spitbergen, and the fry, only 4 or 5 inches long, were caught with the trawl-net on the west coast of Davie'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 swim 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 fish, and generally when caught in a particular size. Among the Scotch islands the Coal-Fish is called Sillock, Plitlock, Coth or Ruth, Harbin, Cudden, Sethe, Sey, and Gray Lord. In Edinburgh and about the Firth the young are called Podleys; at Newcastle the fry are called Coalley, and when 12 inches long Bowdocks. 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 dorsal fin and anal 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 fins bluish-black; ventral 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 silver white, the pellucine.

Catus Pollackius (Catus Pollackius, Linnæus), 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; it is a very plant activity, or from 'lythos,' a stone, in reference to its living in the rocky seashore, although its true nature 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, Lath, 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 reddish brown.

Catus cirrus (Catus cirrus, Linnæus), the Green-Cod. This fish was first added to the list of British fishes by Sir Robert Cumfl, and is a distinct species, as some doubt it, is not only abundant, but has an extensive range. It is mentioned as a distinct species by Linnaeus 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 the young of the Pollack. There is no constant comparison between this fish and the Coal-Fish 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 in 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 explore the depths of the ocean. The species of both."

MERTENSIUS, a genus of Plants belonging to the natural order Boraginacea. It has a calyx of 5 deep segments; corolla bell-shaped, with a short thick cylindrical tube with 5 minute entire segments; filaments several, free, inserted quite beyond the throat; filaments elongate; style simple; stigmas smooth, inflated, rather drupaceous, attached laterally near their base by a flat surface; seeds free.

M. maritimum has a procumbent, branched stem; leaves ovato-elliptic, green, about 3 inches long, with stout, glossy, glaucous; nuts smooth; flowers in racemes, purplish-blue; pro- tuberances in throat of corolla yellow; leaves with a flavour resembling that of oysters; nuts free, forming a plum-like mass; calyx and petals small; perianth of the corolla smaller than the cavity. It is found on the northern shores of Great Britain.

M. oleracea. [Blackberies.]

M. ACIDIC NACH. [CHEMISTRY, S. 1.] MESITYLENE. [CHEMISTRY, S. 1.] MESITONE. [CHEMISTRY, S. 1.]

METEOROLOGY. To the article in the 'Penny Cyclopaedia' of this subject, of which we have supplied the investigation of the atmosphere as the physical medium between the earth and the heavens, may now be added some account of two or three important subjects, our acquaintance with which has recently been greatly improved.

Metcalf, Metcalf. The 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. They are connected to a great extent with the history of the origin of the earth, and the history of the atmosphere. It may be said that the history of science to 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, as well as in the popular historical literature of more recent periods.

The spaces through which the bodies of the solar system and the comets revolve about the sun, appear also to be traversed 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 physiicists the appellation of Asteroids, or Minor-Planets. In these little beings the history of the origin and ancient sense 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, fire- balls, and igneous meteor; new series 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 final 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 projected on the earth are different in their origin and nature, as well as from each other, as from those which we review, may probably be included also under the popular or only half-scientific designations of meteors and shooting-stars.

The appearance of these meteorites is in many cases attended or accompanied by the fall of solid bodies, either stones or metallic iron, or in some cases both mingled together in the same block, forming a series of bodies collectively termed Meteorites (or Arboletes, 'Penny Cyclopaedia,' consisting, mineralogically, of two principal groups, gradually inclining to each other in the atomic proportions of stony and metallic stones).

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, butaring, 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 which meteors are found to contain. Among these it may be remarked are sulphur and phosphorus, both which Davy particularly as capable of combustion in air rared to a degree equal to that of the regions of the atmosphere in which they had been observed to discharge their phenomena. No particle of new matter whatever can be laid 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 which has hitherto been observed. The luminous intensity of light also which attends the combustion of magnesium in oxygen, may be connected with the brilliant phenomena of the meteors.

The luminous extensions in the direction opposite to that of the meteor’s motion, ordinarily called tails, as observed in many, if not in all igneous meteors, are manifestly referable to the elongation of the mass of flame constituting the visible meteor, by the resistance of the atmosphere to its progress through it. In the meteor’s path, of a kind some degree by the adhesion of the air to it; the passage from 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 done in the process of the perpendicular descent of 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 more closely to that of the solid of least resistance. The meteorites which fall, or are cast down from them, when unbroken, especially those consisting of metallic iron, retain approximately the form which had thus been imparted to them by the motion of the meteor. They fall through the air—a form resembling that 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. Brayley.

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 of the light, and is 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’s path, which has imparted enormous heat and energy to the light which was deposited at inassemblable distances from each other, continue 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 slow conducting power of the air, as well as its ability 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, 1859, as reported by Mr. C. Smith, and quoted as a correspondent of the ‘Illustrated London News,’ of the 12th. These views are supported by telescopic observations of the trails, particularly those of the late Professor Pictet, of that left visible for seven or eight 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, continuance, gradual change of form and descent, and final dissolution 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 her passage. In the former case, the beam of finely divided solid matter 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 phenomena, is at once obviated by applying to the subject the results of Professor Stokes’s researches on the internal friction of fluids (noticed in the concluding division of this article) to the case of the meteors. It is evident that the fluid in a fluid of widely-different specific gravity, and to that of the suspension in the air the minute globules of water constituting the clouds. 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 sphaerules also, and will, consequently, be subject to the same law of the velocity of the globules of the clouds, by the resistance of the air toward the motion 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 friction of the air into a species of gravity which would cause it into an oblique curvilinear descent.

The two great causes of all the phenomena now described, are evident the motion and the heat of the meteors. The origin of the former is double, involved in that of the former, as to the nature of the meteors themselves, 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. Daniell, have demonstrated by experiments on 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 in 1854, Prof. P. G. T. Beauregard, Professor William Thomson have 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 cosmical and meteorological science, it is unnecessary to enter upon the question of the origin of meteors and meteorites further than to urge, that, the complexity of the subject, and the extent and number of the visible meteors, however constituted, being often many hundred yards, while in some instances its dimensions must probably be expressed in miles,—their planetary velocity, and the planetary fact that they give out a more intense light than any other heavenly bodies, proves them to be of characters explicitly claimed by the writer of this article for the particular meteorites from which meteorites have been observed to descend, as well as for many, if not all of those from which their fall is 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 even if it should be shown that there is in fact a continuous stream of meteors, or a constant probability of the actual magnitude of many of the meteorites is comparatively 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. R. F. Proctor, 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 concerned.

* These views of the physical constitution of meteors and their trails were in substance advanced by Mr. Brayley in a paper read in 1854 before the Meteorological Society of London, and published in the Philosophical Magazine, first series, vol. iv. p. 268, Dec. 1854, with the additions made in the present article, and with the thanks of the Society to him for permission to publish these views. These views have been subsequently repeated by him in lectures, together with the most recent details as to meteorological phenomena. The present article contains in a measure the result of these speculations.

The latter views, and the experiments described and graphically illustrated in a lecture delivered at a Nurses of the London Institution on the 18th January, 1856; in which also the subject of the partial trails of the meteors was more definitely explained.
cerned, he shares with the American Professor Olmsted, and others. Mr. Greg is the author of a valuable essay on meteors, entitled, 'Observations on Meteorolitics or Aerolites, considered Geographically, Statistically, and Cosmically.' The Catalogue of these falls was first published in the 'Philosophical Magazine' for November and December, 1854, and in a separate form in November of the following year.

The following are among the fallsthat 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., 'Méteores Cosmiques,' tome iv. pp. 181-392; and also in the Report of the British Association, for some 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 1807, on the 29th of February, when two large stones fell at Parmales, in the Madure 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 explained. It is generally thought that the phenomena for which the word meteor is used designate a particular class of phenomena known as 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 phenomena published in various works on astronomy, especially in those of Zahn, C. P. Wolfe, and others. The figures are, from their very nature, temporaries, 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 configuration of the luminous appearances. The circumstance that from the enormous rapidity of the meteor, all the visible phenomena (except the persistent trail) would have been seen and have ceased to appear with the limits of a few seconds of time (so that in all cases the figures must have been produced from memory alone), which must have led to the representation of many appearances as simultaneous that in reality occurred in succession, 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 process by which natural objects, thus witnessed for a few seconds only, were forever fixed in the memory of the observer, and regarded with superstition, supposed to be really preternatural types of the familiar objects to which the outlines of their forms were comparable; the meteor, thus superposed, fixed in the mind's eye, and the like would naturally be described and depicted with all the approximations and paraphe-\nations of those objects. These accomplishments, however, were not in all cases merely suppositions, as may be evinced by reference to the great meteor of 1783, which em-\n\n\nabled the ringed sceptre of the medivial figures, the rings on the shaft being manifestly the smaller meteors, the production of which is the first visible result of the explosion, seen as projected upon the tail of the parent meteor; either because, as is evidently the case in many instances, they were really enveloped in the meteoric splendour it filled the air, and its glow on the 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 distant part of the tail shining with red light, being cooled down to the temperature of simple igni-\n\ntion, as already indicated. In a similar manner, the bull's heads, flying-shears, and other monstrous appearances may be explained by the apparent position of the objects, the care being taken, when the authorities permit, to identify the phenomena correctly (otherwise otherwise recorded. The blazing and interlaced serpents, moving in the air may be explained by reference to the actual phenomena of the persistent tracks or trails already described, as witnessed in the reports of the Franklin institute, and other public representations of the meteor of January 7, 1826; one instance may be cited, in which a large and beautifully luminous serpentine train continued for some minutes after the disappearance of a meteor which threw down a stone at Angus, in 1822. The embattled tresses attached to blazing stars are evidently the trails under another phase, and in their later condition, emitting red light only, but retaining their linear or band-like form.

The Lepidopa columbina and Dracoma volantes of former ages, are understood, by reference to other characters and phenomena of meteors: one of the contemporary figures of the fire-ball seen in London on November 13, 1803, (described under other phases by Dr. F. Firminger in the 'Philosophical Magazine' for November 13, 1803) was a particular configuration of the meteor to which the latter appellation was given. This is contained in Nicholson's 'Philosophical Journal' for 1804.

From the latter division of the subject now summarily reviewed, an inference may be drawn, which though suggested also by other objects of science and literary history united—arises, it is conceived, in a particular manner out of the ancient history of Igneous Meteoric Stones. Meteoric stones, of any of the prodigious sights and supposed portents of moral or historical events, which are described in old chronicles and other works, may be explained, it has been shown, by our present acquaintance with the true nature of such phenomena. The inference is this—that the superstitious notions and ideas of preternatural manifestations and their signification, held in former times, were often found in mere ignorance of certain natural phenomena; and that there may be little either of superstition or intentional mispre-\n
\n\n\n\nunderstanding in the representations of those phenomena as they were employed in old chronicles, for the representations of later times, especially those of modern writers, have employed with much more accuracy observations they frequently include, and to separate them from the erroneous views with which they have been mingled; and thus to render the observations themselves, in numerous instances, available in the advancement of true knowledge.

Suspension of the Clouds. The most recent view of this subject, apparently a very simple one, but which really involves a variety of physical principles, is that of Sir John F. W. Herschel, stated in the following terms (Keeley. Brit. Ed. 8, vol. xiv. p. 635): "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 advance an upward current, and thus to counteract the effect of gravity on 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 mitigated by a momentum of velocity of descent of one foot per second (supposing no friction and no draft); and even if the terminal velocity were reduced to half that quantity by these causes, would still require some such upward action to enable it to maintain its level—a circumstance which shows how far the actual condition of the suspended cloud of during the night. It is more than probable, however, that, when not actually raining, cloud is always in process of generation from below, and dissolution from above, and that the moment this process ceases, rain, in the form of 'mizzle,' 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 equilibrio, and all the particles in a state of upward movement. To the phenomena of rain and snow must be required but an adequate estimate of the effects of the 'friction' and the 'draft,' which are supposed not to exist. But it appears to have escaped the attention of Sir J. Herschel, that Professor Stokes has already shown that the internal friction of the air, together, of course, by implication, with the 'draft' 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 believe) little noticed, it may be worth the while of others to pursue the inquiry for themselves (especially by reference to one department), of great importance in meteorology, we shall treat it at some comparative length. Clouds consist of an aggregate of separate minute globules of water; and the resistance to such a globule from the atmosphere with which it is surrounded is 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 are now speaking, as to allow of the air remaining undisturbed. In parent suspension the clouds do 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 insignificant (as will presently be shown), compared with the 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 theories 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 assumptions 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 Dubruit and the inherent property "analogous to that of viscosity in liquids," ascribed to elastic fluids by Capt. (now Major-General) Sabine, from their respective points of view, and by Charles Hutton, and the results of an experiment of Stokes as consequences of the internal friction of fluids in general, all fluids exerting a resistance to bodies passing through them, independently of their density; and when this resistance is proportional to the velocity, there is no reason to doubt that the pressure cannot be equal in all directions.

The suspension of the globules of water forming the clouds, is only a particular case of the more general fact that fine powders remain nearly suspended in a fluid of widely different specific gravity. Professor Stokes has demonstrated that the resistance of the fluid, whether liquid or gaseous, 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 gravity—becomes independent of the radius, and as the radius 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 2535 inch per second; for a half the 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.

Of that part of the resistance which varies as the square 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 1593 inch per second, is not quite the one four 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 experiments on that instrument; and is contained in his memoir "On the Effect 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 denounced by the author of the velocity of Fluid Motion inserted in the preceding volume of that work, METHIONIC ACID. [CHEMISTRY, S. 2.]

METWOLD. [NAPOL.] METHYLMETHAN. [NAPOL.] MEYAMMA. [LONDON.] MEVAGISSY. [CORNWALL.] MEWER. [RAGTOPANA.] MEYER, SIR SAMUEL RUSH, K.H., LL.D., celebrated for his antiquarian knowledge, particularly in matters relating to ancient armour, was born on the 26th of August, 1783, and was the son of John Meyrick, Esq., of Great George Street, Westminster, and Peterborough House, Fulham, who was descended from the Meyricks of Bödorgan, Anglesey, and married a sister of Richard Jollif, of Queen's College, Oxford, but we have little other information of his early life, beyond the statement that he married about twenty years of age; and thus offended his father, who, in consequence of his inheritance of his family property, that it should chiefly pass to the next generation. It thus happened that the large collections of armour which were commenced by the subject of this notice at his residences No. 3, Sloane Terrace, and No. 20, Upper Cadogan Place, were neglected and, in the end, were known as those of Llewelyn Meyrick, Esq. The original intention as to property was however frustrated ultimately by the death of that son in 1837.

Samuel Rush Meyrick adopted the branch of the legal profession connected with the Chancery, Exchequer, and Admiralty Courts, in which, as Dr. Meyrick, he practised for many years. Prior to this, in 1810, he had published 'The History and Antiquities of the County of Cardigan.' In 1812, he was engaged upon a history of the plan of that of Dr. Henry, relating to the period of the monachies of the British blood, before their abolition in 703. The materials, which were collected for a work of great extent, were however not published in the form intended. But in 1814, with Captain Charles H. Fox, he published the "History of the Original Inhabitants of the British Islands," which was published in 4to with plates. His great work on Arms and Armour was published in 1834 in three 4to volumes, and under the title of the "Imaginary Armorial History of what existed in Europe, but more particularly in England from the Norman Conquest to the reign of King Charles II., with a Glossary of Military Terms of the Middle Ages." A new edition of this work appeared in 1843, under the care of Mr. Albert Way, with corrections, much improved in apparatus and quotations. Dr. Meyrick assisted the Rev. T. D. Fosbrooke in the compilation of his "Encyclopedia of Antiquities," of which the first edition appeared in 1826. In 1826, the authorship of Dr. Meyrick was sought in the arrangement of the collection of historical arms at the Tower of London ("Gentleman's Magazine," 1826, 1827): and in 1829 he was called on by George IV. to arrange the collection at Windsor. For these services, the Hanoverian order was conferred upon him by William IV. in January 1832, and he was made a knight-bachelor on the 22nd of February following. Meanwhile, about the year 1827, Dr. Meyrick had endeavoured to purchase the ruins of Goodrich Castle, on the Wye; but being then unable to succeed, he offered them to the Earl of Fife. In 1833, the Earl of Blore was the architect, and which is now well known as Goodrich Castle. The main part of the plan was arranged specially for the display of the collection of armour,—the whole suite a chamber, where a suit of armor was suspended a grand tournament. The chief scenes in the display are shown in a work published, by Mr. Joseph Skelton, F.S.A., in 2 vols. 4to. in 1830, and entitled "Engraved Illustrations of Ancient Armour," &c., to which Dr. Meyrick supplied drawings and descriptions. In 1834, when High Sheriff of Herefordshire, he revived a procession of the javelin-men in armour, and with medieval pageantry. In 1836 he contributed the descriptive matter to Mr. Henry Shaw's "Specimens of Ancient Furniture." Sir Samuel Meyrick's last important work was 'Lewis Dunn's heraldic visitation of Wales' which he completed in 1846. He had continued a frequent contributor to the Proceedings of the Society of Antiquaries (of which body he was elected a fellow in 1810). Some of his contributions are printed in the "Antiquaries", and others are referred to in the "Gentleman's Magazine," in which work also he wrote many papers from 1823 to 1839 ("Gent. Mag., New Series, vol. xxx., p. 94). Latterly he also contributed to "The Analytical Review" and Quarterly Journal, "The Cambridge Archaeological Journal," &c. Sir Samuel Meyrick died on the 2nd of April, 1846, in his sixty-fifth year. His collection and his domain in Herefordshire, which last he had largely extended by purchase a few months before his death, devolved upon his second cousin Colonel Meyrick.
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 Pie' of Bologna—and eventually to the archiepiscopal seminary, where he worked in the classics, letters, metaphysics, law, rhetoric, logic, 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 learned many languages, and wrote a series of letters, essays, and dialogues in childhood, with a very wonderful memory; and that, partly under the various professors in the university, partly by the aid of foreign residents in the city, partly by his own unassisted efforts, he acquired, before the completion of his university career, the Latin, Greek, Hebrew, Arabic, Spanish, French, German, and Swedish languages. In September 1779, at the early age of twenty-two, he was appointed Professor of Arabic in the university, and commenced his labours 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 Cispalian Republic, he refused to take the oath of the new constitution, and was set aside from the professorship. After the conclusion of the treaty between Pius VII. and the first consol, the ancient constitution of the university was restored. In 1803 Meszofanti was named to the higher professorship of Oriental Languages, and, as he had never been a subscriber to the Universal Library of the public library of the city. The professorship of Oriental Languages, however, being suppressed in 1806, Meszofanti was for some years reduced to great distress, and became dependent for his own maintenance, and that of the orphan family which he supported, on his income derived from private tuition. The elder brother of the late Archdeacon Haro is said to have been one of his pupils, and a living English countess received lessons in English from him at a later period.

Meanwhile Meszofanti steadily followed in private what had become his engrossing pursuit—the study of languages. A letter of his, dated in 1804, to the celebrated Orientalist John Bernard de Rossi, whose personal acquaintance he had frequently formed during a short visit to Madrid 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 Meszofanti," 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 spectacle had enabled him, in the most opportune moment of extending his stock of languages. In the hospital of Bologna, to which he was attached as volunteer chaplain, were to be met—among the invalids of the Austrian, Russian, and French armies—Germans, Hungarians, Bohemians, Wallachians, Muscovites, Persians, Turks. His wish was to offer these sufferers the consolations of religion, partly from his love of the study itself, Meszofanti 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 intercourse. He thus gained 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 these notables in 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 French, who frequently met me 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 in my way. I was constantly filling my head with new words. Whenever a stranger of any distinction of rank or of 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 flexibility of the organs of speech."

In the year 1813 Meszofanti was appointed associate-librarian of the university; in 1814 he was reinstated in his professorship of Arabic, which he retained during 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 representation of his extraordinary knowledge of languages. Among these a particular friend of his was Mr. Stewart Rose, in 1817, reported him as reading twenty languages, and speaking eighteen. Baron Zach, in 1820, sets down the number at thirty-two. Lord Byron, about the same period, speaks of him as knowing eighteen languages, of which he could converse in more or less fluently, and a Brieveurs of parts of speech." When Lady Morgan saw him, in 1829, 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 1829, 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 Turkish, were the languages about which he manifested the most impatience. He would only 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 at Bologna. In 1823 he transferred his residence to Paris, and in 1824 to Vienna, and in 1826 to Rome. In 1827 he was invited 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 chair of Orientalist of the Propaganda, Meszofanti was appointed to succeed him in the important charge of the Vatican. He held this office till 1835, in which year, conjointly with Mai, he was elevated to the cardinalate.

His 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 Meszofanti's linguistic studies. The reports of his visits at Rome are still more marvellous than those of the Bolognese period. An eminent German scholar, Herr Guido Görrés, who had much intercourse with him in the year 1841, writes thus: "He is familiar with all the European languages; and by this means he has obtained every opportunity of studying the modern ones of the first 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, which he speaks, besides Hebrew, the Arabic, the Syriac, the Samaritan, the Caides, the Sabic—they, even with the Chinese, which he not only reads, but speaks. Among the Hamitic languages, he knows Goffe, Ethiope, Abyssinian, Amharic, and Asmussi."

What is especially remarkable in the miscellaneous gift possessed by Meszofanti 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 term "perfect," as used in this connection, is derived from what he can do. That the range of language concur in describing him as speaking in each always with the precision, and in most cases with the facility of a native. His pronunciation, his idiom, his vocabulary, were all unexceptionable. Even the familiar phraseology of the day in his mother tongue, and the professional 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 of expression.
French, he was equally at home in the pure Parisian of the Faubourg-St.-Germain or in the Provençal of Toulon. He was noted not only for his command of the French tongue, but also for his ability to speak the language of the Black Forest, or to the classic vocabulary of Diderot; and he often amused his English visitors by specimens of the provincialisms of Yorkshire, Lancashire, or Somerset.

The latter of these views, and the quality of his works, which made the name of Mezzofanti almost household words, was well acquainted. He loved to talk with his visitors of the great authors in their respective languages; and his remarks are described as invariably sound and judicious, and exercising careful and various reading, often extending to depictions of women in which his words of admiration were extraordinary. From the poetry of Meli; and an English gentleman was astonished to hear him discuss and criticise 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 Travels of the man as elastic in his powers of adaptation as Mezzofanti replied to a sonnet which Dr. Wap had addressed to him; and the well-known Orientalist, Dr. Thoukuck, having asked Mezzofanti for some memorial of his visit, received from him a Persian couplet after the manner of Hafiz, which contains (although not without some delay) during Dr. Thoukuck'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 Chinese, which he acquired (partly at the Chinese College at 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 American Indian languages, the California, some of the North American Indian languages, and 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 posing in conversation from one language to another, without the slightest mixture or confusion, whether of words or of pronunciation.

Mezzofanti, as cardinal, was number of many ecclesiastics received from a Rome, but he never held any office of state. He died on the 15th of March, 1849, and was buried in the church of St. Onofrio, beside the grave of Torquato Tasso.

It is difficult to determine with accuracy the number of languages known to Mezzofanti, and still more to ascertain how many of these he spoke, and with what degree of fluency in each. During his lifetime, as we have seen, report varied considerably at different times; nor was he himself believed to have made any very precise statement on the subject. To a Russian traveller, who visited him before the year 1846, and who begged of him a list of all the languages and dialects in which he was able to express himself, he sent a paper in his own hand containing the name of God in fifty-six languages. The author of a memoir which appeared soon after the cardinal's death in a Roman journal, the 'Civiltà Catolica' (who is now known to be Father Drescian, a Roman Jesuit), states that, in the year 1846, Mezzofanti himself informed him that he was able to express himself in seventy-eight languages. Unfortunately these statements may appear, they seem fully borne out by inquiries (with a view to the preparation of a biography) which have been made since the death of the cardinal. Reports have been received from various parts of the world that many of these languages are still spoken, and that Mezzofanti's works are still studied. Furthermore, 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 these communications, whatever may be their truth or error. From 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 note specifying 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. Lebri, 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 Ciba Ganna (the algebra of the Hindus), as well as on the general subject of mathematics and its history and application. Other travellers describe 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 they were the only known publication of a short memoir of his friend and brother professor, Father Emmanuel Aponse, which was printed at Bologna in 1820; 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 120° and 60°. The crystals usually with the acute edge replaced. The cleavage is very decided, yielding easily thin plates or crystals, and especially in thin foliated masses, plates, or scales; sometimes in 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. Transparent or translucent, as in elastic. Hardness 2 to 2 1/2. Specific gravity 2.8 to 3.

The composition of mica is as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Formula</th>
<th>Specific Gravity</th>
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<tbody>
<tr>
<td>Silica</td>
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</tr>
<tr>
<td>Alumina</td>
<td>Al₂O₃</td>
<td>3.6</td>
</tr>
<tr>
<td>Potash</td>
<td>K₂O</td>
<td>1.9</td>
</tr>
<tr>
<td>Pyroxyde of iron</td>
<td>FeO</td>
<td>5.3</td>
</tr>
<tr>
<td>Fluoric Acid</td>
<td>HF</td>
<td>0.67</td>
</tr>
<tr>
<td>Water</td>
<td>H₂O</td>
<td>1.2</td>
</tr>
</tbody>
</table>

A variety in which the scales are arranged in a plasmous form is called Phanerozo Mica; another in which the plates have a transverse cleavage, has been termed Prismatic Mica.

Mica resembles 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 it does not crumble so much on the edge. 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 limestone. It is found abundantly in the United States, in Russia, in Great Britain, and other parts of Europe. It occurs in 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 Muscovy Glass. The very thinnest 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 aggregated scales.** It occurs in the Ural. According to Reeve, as quoted by Dana, it consists of the following analysis —

<table>
<thead>
<tr>
<th>Component</th>
<th>Formula</th>
<th>Specific Gravity</th>
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<tr>
<td>Lime</td>
<td>CaO</td>
<td>2.7</td>
</tr>
<tr>
<td>Proxodite of manganese</td>
<td>MnO</td>
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</tr>
<tr>
<td>Potash</td>
<td>K₂O</td>
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</tr>
<tr>
<td>Lithia</td>
<td>Na₂O</td>
<td>2.8</td>
</tr>
<tr>
<td>Barium</td>
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<td>2.9</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Cl₂</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Fuscisile is a green Mica from the Zilleralp, containing nearly 4 per cent. of oxide of chromium.**

From the description of the species of mica, have been made out of the old species so called. The common Mica has an oblique prism for its primary, but many micas when..."
in perfect crystals have the form of a hexagonal prism. This species has been called hexagonal mica, the dark-coloured micas of Siberia, and the brilliant hexagonal crystals of Vesuvius. There are also hexagonal crystals which have been found by Dövé to have two axes of polarisation, indicating that the three axes of the hexagonal form are not all equal, and that the form is a rhombic prism with the acute edges truncated. This species is called *Rhombic Mica, or Photographit.*

*Margarite,* or *Pearl Mica,* occurs in hexagonal prisms, having the structure of mica, and also in interlocking lizardine. It has the appearance of talc, but differs from that mineral in being a silicate of alumina instead of magnesia. It is found at Siarng in the Tyrol, associated with chlorite.

*Micotmica,* or *schistose talc of Zillerthal,* is a variety of common mica.

*Emerylite* and *Euphylite* are new species, somewhat related to *Margarite.* They are found in Pennsylvania, United States.

*Nacrite* resembles talc, but contains no magnesia. It is whitish and soft, and has a greasy feel.

*Lepidolamite* is a black iron mica, occurring in 6-sided scales or tables aggregated together.

*Omorophite* is an allied mineral occurring in black scales.

*Oderite* 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 known, was born in the year 1798 at Nowogrodzie, 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 contribute to the unity of nationality, and the regeneration of Poland from being overpowered by those of Russia, 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, and his end was 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, published in 1831, he introduces his family name as that of a disreputable and belligerent nobleman in a pastoral. 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 this respect was very different from that of their English prototypes.

Mickiewicz after receiving his preliminary education at Nowogrodzie and the grammar-school of Minsk, was sent when a boy of seven to the University of Wroclaw, where his uncle, an ex-Jesuit, was one of the professors. The university under the auspices of Snidecki the mathematician, and the patronage of Prince Cartoryski, then Minister of Public Instruction, at the time of its liberation, the chief seat of learning for eleven millions of the population of 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 government, and to him Mickiewicz addressed the first poem he published. While at Wilna he fell deeply in love with the sister of a fellow student, Maria Wereszewskowa, by whose addresses were finally rejected for those of a richer suitor. When he left the university, where he had first 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 at once read and admired. 'Grzazyna,' in which the poet takes for his scene the old castle of Nowogrodzie, the ruins of which are still remaining near his native town, he tells in a tersely classical and sculpturaque style, which reminds the reader of the happiest effusions of Tennyson, the story of a Lithuanian heroine, who, in consequence of the wanton rage of her lover, meets death on the field of battle. It became the favourite poem of a real Lithuanian heroine, Emilia Plater, who eight years afterwards fought in the Polish ranks in the insurrection of 1830. The 'Dziady,' 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 he relates, with this slight veil, the story of his love for Maria, the 'Mary Chawor,' or 'Mary of the Lilies,' whose memory Mickiewicz does not forget. The 'Dziady,' published after long years of interval—"To the sacred memory of John Sobolewski, of Cyprian Dziskiewicz, of Felix Kolakowski, my fellow-students, my friends, and my countrymen, and to the memory of Marias Zdanowicz, my fellow-country, who, with a longing for that country in their hearts, died at Archangel, at Moscow, at St. Petersburg, the martyrs of their country's cause." Imprisoned for upwards of a year in the Basilian convent at Wilna, while the examination into the conspiracies and insurrections against the Russian government, Ruizylev and Bestebun, afterwards so active in the abortive insurrection at the accession of the Emperor Nicolas, were ardent for the Polish cause. In a poem "to his Russian friends," written in after years, Mickiewicz speaks of the indignation with which he regarded the venality of the Tsar, and alludes apparently to Pushkin, to whom they introduced him, as having deserted the cause of liberty. The 'Russian Byron' and the 'Polish Byron' met at St. Petersburg, and the idea of a division of labour evidently struck them, and the poet of *Grzazyna* seems to have been so easily accessible to them. The division of labour was not looked upon with favorables 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. That subject now gives them an additional interest. One of them is 'On the View of the Mountains from Kozlov,' or 'Eptoria; another, 'On the ruined Castle of Balaklava.' These poems have been very popular; and one of them, 'The Peasant Boy of Rumania,' the inhabitants of which are of 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 active opposition against the Russian government. Ruizylev and Bestebun, afterwards so active in the abortive insurrection at the accession of the Emperor Nicolas, were ardent for the Polish cause. In a poem "to his Russian friends," written in after years, Mickiewicz speaks of the indignation with which he regarded the venality of the Tsar, and alludes apparently to Pushkin, to whom they introduced him, as having deserted the cause of liberty. The 'Russian Byron' and the 'Polish Byron' met at St. Petersburg, and the idea of a division of labour evidently struck them, and the poet of *Grzazyna* seems to have been so easily accessible to them. The division of labour was not looked upon with favorable 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. That subject now gives them an additional interest. One of them is 'On the View of the Mountains from Kozlov,' or 'Eptoria; another, 'On the ruined Castle of Balaklava.' These poems have been very popular; and one of them, 'The Peasant Boy of Rumania,' the inhabitants of which are of
every Russian. Two Russian translations were published, and it is even said that the Emperor Nicholas sent a message of praise to the poet. The enthusiastic support of the Russian service was also, it is said, proffered 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 Zhukovsky. He left Russia, as he himself said, in 'absentia' and for his health, and arrived in Paris in 1825.

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 was crowned with success only after the suppression of the Polish nation at Warsaw. The news reached him with the Ode to Youth. The rising was crushed by the time Mickiewicz had reached Posen on his way to join it. He retired to Dresden, and then returned to Paris through the part of the 'Dzidzi', 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 represents 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 being. As a priest, he is the representative of a peaceful spirit, but even a heavenly, the importance of which is represented as having called down the chastisement. This strange and repulsively scene is accompanied by others of a less eccentric character, in which the poet's friends and foes are represented in a most unflattering light. The horrors of the Russian army 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, 'Pan Tadeusz,' or 'Sir Thaddeus,' was published in Paris in 1834. It differs as entirely in style and sentiment from the 'Dzidzi' as 't' reason for the Lithuanian domestic life in the year 1812, the time of the poet's boyhood, in which the somewhat insignificant story of a common-place hero 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 it 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 hope. His first work was published in the literature of his country without a rival either in the present or the past. "He is our Byron, our Shakspere," was the verdict of Klementyna Hoffmanowa herself, a staid and decorous writer. None indeed could then have foreseen in what darkness the star of Mickiewicz was to set. In 1839, two years before the appearance of 'Pan Tadeusz,' he had published 'A Book of the Polish Nation and the Polish Pilgrimage,' which presented an unbroken series of dull absurdity and extravagance. It was probably the influence of his name which procured its translation into French by Count Montalembert, and into English by Lach Szyma, combined with the fact that it in Mickiewicz presented himself to the world in the character of a fervent Roman Catholic, convinced that it was to its toleration of Protestantism that the ruin of Poland was to be ascribed.

Before this period Mickiewicz had fixed his residence at Paris, and it was in that city, in 1834, that he became united to Celina Szyma, a Polish lady, to whom he had, in 1829, promised to return. In 1838 he returned to Poland, but to the French he was strongly attached, but his pecuniary circumstances compelled him to accept, in 1839, an appointment as professor of classical literature at Lazanne. In the character of a literary and historical historian, determined to establish a chair of Slavonic literature and the Slavonic languages at the College of France, it was considered a good fortune for the minister to be able to appoint, for the first professor, the greatest poet of Poland. The first lectures which he gave were eagerly attended, and were reproduced in the French and German journals; but ere long strange alterations began to develop themselves.

Brandon, in 1841, when Madame Mickiewicz, who was in bad health, had received some benefit from being mesmerised by a Polish fanatic named Towsianki, Mickiewicz had allowed himself to become associated with this man as the interpreter of certain dreams, in which Towsianki alleged that he was favoured with particular revelations on Slavic literature and the Slavonic language. Mickiewicz, who was represented as the new Messiah of a new religion, of which the principal feature was the worship of 'Giesza,' the word for 'Virgin Mary,' was represented as a new and necessary development of improved Christianity. At last, in 1844, the French government interposed, ordered Towsianki to quit Paris, and put a stop to this course of proceedings. Towsianki and his wife were tried and acquitted, and Mickiewicz's name appeared in the list of professors for some years afterwards, but he lived in obscurity, an object rather of compassion than other feelings. In 1848 the revolution of February again excited his hopes for Poland, and he made a journey for that purpose of gaining over the pope, and was received with enthusiasm by the insolent at Florence. In 1851 his name appeared in the French calendars as 'Sub-Librarian of the Library of the Arsenal at Paris;' for which he was appointed by the president, who expressed the hope that this venial error the incalculable of the holiness of Napoleon I.

About 1854 Mickiewicz became a widower, and he afterwards returned in some degree to public life. Soon after the revolution in France he was appointed by the government commissioners, in connection with the French emperor, to remind him of the opportunity that presented itself for redressing the wrongs of Poland, and in 1856 he was sent by him on a secret mission to the East, which was destined to prove the last incident in his career. He died at Constantinople on April 26, 1855. His remains were removed to France, where they were interred in the cemetery of Montmartre, and a subscription was opened directly after at Paris and London for the benefit of his widow.

One of the most remarkable editions of Mickiewicz's works was published at Paris in 1829 and 1829, in three volumes, at the expense of the Countess Ostrowska, a Lithuanian lady, who presented the money received from its sale to the author, then a captive in Russia. It is generally stated to be the first book printed in French in the Polish language, but it had two predecessors, as its editor, Leonard Chodzko, points out in the preface—one in 1829 and another in 1814. Its successors may be counted by hundreds, many of which have been published in London, as well as at Paris and Berlin. The best edition of Mickiewicz's works is that in four volumes, issued at that city in 1844, revised by the poet himself, and edited by Alexander Chodzko. A translation of all his works into English was published at Oxford, and another at London in 1847; and in 1844, he was published at Paris in 1841, and again in 1844, with two very different prefaces, the first all enthusiasm for Mickiewicz and his genius, the second full of the disappointment and estrangement his devotion to Towsianki had inspired. The English language possesses one only of his larger poems in two translations—the 'Wallenrod,' in prose by Leon Jablonski, Edinburgh, 1841, and in verse by Catley, London, 1842. An article of some length on Mickiewicz appeared in the London 'Metropolitan,' at the outset of his career, and another in the 'Athenaeum' for 1856, on the occasion of his death.

The name of the 'Polish Byron,' which has been generally assigned to Mickiewicz, conveys as correct a notion of his character and the extent of his genius as any single epithet could possibly do. The most striking point of dissimilarity between the two is the vehement patriotism of the Pole, and the indifference to his country which was professed by the Englishman, but a great deal of this was probably owing to the different revolutions by the Virgin Mary. In his lectures of a foreign sovereign, and the other in the most prosperous period of his history. It may be remarked that in 'Pan Tadeusz,' where Mickiewicz has occasion to delineate the character of a gallant Polish knight, the poet seems, perhaps on his own part, as arrogant, ignorant, prejudiced, spiteful, and hesderong, with scarcely any good qualities to balance. There is an obtrusiveness in Mickiewicz's own moral perceptions which it is often painful to observe. His poem of 'Wallenrod' is devoted, from the first line to the last, to the incalculable of a spirit of systematic treachery, and in one
In microscopic observations two things must be remembered: that in the microscope, especially with high powers, we see 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 more often happens that upon examining a surface we find it impossible 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, is a matter of great difficulty. Such that we seldom see the objects 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 knives of the opticians. Long and thorough practice with the microscope secures the observer from deceptions which arise, from any fault in the instrument, but from a want of acquaintance with the microscope, and from a forgetfulness of the wide differences between the eye through a microscope. Deceptions also arise from a neglect to distinguish between the natural appearances of the object under observation, and that which it assumes under the microscope.

To obviate these difficulties must be added those originating in the eye itself, through the so-called ‘Mouche volantes,’ and those also which arise from the observer being unacquainted with the appearance, under the microscope, of the common things which are dispersed throughout the air and water, such as air-bubbles, mud, and other material. These are also caused by air-bubbles, by molecular motion, and by the currents which arise upon the stage of the microscope from the evaporation of water, or from the intermingling of two fluids. The observer must learn to know these, and to know when they are the cause of the errors, and then no further deceptions can arise from these causes.

The proper use of the microscope is always the principal thing to be considered. Hedwig, with the microscope of his time, examined a few objects, the greater extent than many 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 thoroughly; he must verify his own observations as scrupulously 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 only in a hasty way, and in the wrong direction, do not lead to any knowledge of the wood under observation. Single observations (of wood, for instance), irregularly made from time to time, only show the condition of the wood at the time of that particular observation, and throw no light on its condition at an earlier or later period; whilst sections taken in a proper manner, and well-preserved 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 we have arrived by means of the microscope. 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 already described how by means of 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 forms of the crystals obtained from organic 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 crystal objects, by the means of which the crystals, 'will be found in Dr. Otto Funke's 'Atlas of Physiological Chemistry,' and also in the 'Micrographic Dictionary,' by Dr. Griffiths and Mr. Henfrey.
Not only are the natural crystaline constituents dissolved up in liquids thus obtained, but new combinations obtained by the addition of re-agents. This mode of inquiry is equally applicable to the microscopic anatomy of the body, and the importance of the results 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, the microscope, in the hands of an experienced operator, is replete with the most interesting and important results. The knowledge is obtained by the geologist by examining minute portions of them with the aid of the microscope. It is by this aid of this instrument alone that the question of the manner in which an extensive series of rocks has been deposited, and the manner in which they are superimposed on each other, can be decided. In all these cases, the microscopic examination is applied to the determination of the nature of the material, and its structure, and is as much applicable to the study of the origin and geographical distribution of rocks, as to the study of the geographical distribution of plants and animals. In this manner, the microscope has been a source of increasing interest to microscopic observers.

The earliest observations on the minute being were made by Leucow, a Dutchman, who discovered them in the 16th century. In the year 1665, it was left for Ehrengard, during the present century, to make known to it full extent the immense variety of forms assumed by these microscopic beings. [DIATOMACEAE: S. 2; MOLLUSCA: S. 2; ECHINODERMA: S. 2; and STAR FISH: S. 2.] Since the publication of the last-named work, the curious and interesting objects presented to the microscope have been the subject of research by many observers, and have been studied with increasing success. The objects of microscopic investigation are now divided into two classes: those which are visible to the naked eye, and those which are only visible with the aid of the microscope.

The cells of the animal and vegetable kingdom are the most important objects of microscopic investigation. They are the fundamental units of the plant and animal world, and their study is of the greatest importance to the student of biology. The cell is the smallest unit of life, and its structure and function are of the utmost importance. The study of the cell is of great importance to the student of medicine, for it is in the cell that the fundamental processes of life are carried on. The cell is the unit of growth, and it is in the cell that the genetic material is stored. The cell is the unit of reproduction, and it is in the cell that the process of sexual reproduction is carried on.

The microscope is the most important tool in the study of the cell. It is by the microscope that the structure of the cell is studied, and its function is determined. The microscope is the tool by which the student of biology can learn the secrets of life, and it is the microscope that has made the study of the cell possible. The microscope is the tool by which the student of biology can learn the secrets of life, and it is the microscope that has made the study of the cell possible.

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with such an illumination; for exact, observation, therefore, the daytime only must be selected. In order to interrupt the light of the horn substance, the means of the light, and the light is thrown upon the beam downwards, the microscope is placed at least three feet from the window, the microscope is turned with the mirror towards the light, and the whole instrument, but especially the mirror, is placed in different directions. When the eye-glass looks through the microscope, the light is, in fact, sought after; when the field of view appears clearest and brightest, the object which is to be observed is pressed to the microscope.

When it is wished to examine opaque objects with intense light, the microscope may be advantageously brought 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 power, which is produced by means of the greatest possible quantity of light is concentrated upon 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 undertaken must be sufficiently large, and very firm; it must be so arranged that all the apparatus which is ever wanted shall be within reach. There is no more pleasing than the speed at which a microscope can be used in microscopical investigations when time passes only too quickly; moreover, in a very confined space, it is impossible to make effective preparations with the simple microscope. Every observer who has observed in a microscope, will remember the first instance with a low magnifying power, since by that means a larger portion of the object is seen, and thus a better impression with the whole is obtained. Should the light be too strong, the plane mirror may be used instead of the concave one. When the observer has gained 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 used, and a still stronger magnifying power is found desirable, 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 passing from 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 the eye-glass, since both the light and the sharpness of outline of the image are necessarily diminished by the use of a powerful eye-glass, which is not the case in using a more powerful object-glass.

When the object is thin enough to be seen with transmitted light, it is first illuminated with light transmitted directly, and is examined with gradually increasing, magnifying powers; should any details of the image remain undefined, obliquely transmitted light is used, which is inaudited 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 not wanted, 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 not clearly defined, particular attention must be paid to this circumstance. In many objects, the light of the same general rule generally holds good, and particular care must be taken, by turning either the stage or the object itself, to concentrate the light in all possible directions upon the object. Objects-glasses of very high power cannot be used with incident light, inasmuch as the shortness of their focal length prevents the light from falling upon 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 powers are sufficient when incident light is employed. As incident light is employed, it consists of Iceland spar, one of which is fitted beneath the stage, the other is attached to the eye-piece. Tourmaline is also used for the same purpose. Large crystals of iodine of quinine have also been shown by Dr. Herapath to be applicable in polarising light for the microscope. (Quarterly Journal of Microscopical Science.) 1000 powers of the object-glasses frequently exhibit their structure in a more perfect manner. Various objects, especially crystals of a spherical or oval form, exhibit a beautiful variety of colour in this way. In some cases 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 in order to do so the object-glass is changed for a case of the object-glass which operates injuriously, especially when the object is not quite covered by it: it is therefore advisable, for certain particular objects, as, for instance, the embryos of grasses, to observe them with a glass which is free from water, by placing the fluid in a cover, and adding water with a camel's-hair brush, the object is generally sufficiently and fully immersed. When low-magnifying powers are used, it is not necessary that the object 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 preparation, it is very advantageous not to cover it; when object-glasses of very high power are used, the time is saved by not using a cover, as the less the object, the less is the effect of 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 freely becomes less powerful, to the extent of about one-third, and in the case a fresh drop 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 and waxed.

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 cannot be taken. The vapour of sulphuretted hydrogen has 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 always to use the cleanest water, in the cleanest vessels, for moistening the slides. Even with this precaution it is impossible to prevent the object-glasses from becoming coated with particles of dust. 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 will contain much dust, which is liable to obtain the inferior sorts of animals and plants; and when different objects are examined one after another, fresh water should be taken for every new object, in order that no particles of the objects which have been previously examined may be mixed with the water upon the slide. Mucilages may be traced to a neglect of small precautions of this sort.

In order to be able to recognise extraneous objects as such, 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 is white; 2nd, Dust, which appear as a dark spot on the cover 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 its aid accurately detected both in and between the cells of plants. 3rd, Colourless or coloured fibres of paper, or of linen, woolen, or silk-textures, left behind upon the object-glasses, from the cloths with which they have been cleaned, and also the hairs which have been made fast with the brush, and also 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 water, it is necessary to pass them through a spirit for a short time, and this spirit must be paid to the many organised bodies which are likely to be met with: pains must be taken by careful observation to become acquainted with the lower forms of animals and
plants: it is necessary, for instance, to be able to distinguish the common forms of *Infusoria*, both those that are provoking and those that are not, which is particularly important in connection with 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 another object which can be examined in this way. 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 objects, the latter should be softened by heating the brush 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 by cutting the object, from the real object.

Appearances of motion, either usual or accidental, may also give rise to mistakes, and these must therefore be learned. Molecular motion is peculiar to all very small bodies, contained in a thin liquid medium; it consists in a trembling motion of some of these small bodies; it is often seen in the interior of pollen grains; it can be observed still better in certain fluids, for instance milk, when a small quantity is mixed with water, and placed under the microscope. The milk becomes opalescent from time to time due to the phenomenon of molecular motion.

When acquaintance is once made with this phenomenon no further deception can be caused by it. The same effect follows from accidental currents upon the object-plate, which may take place either by evaporation or by the mingling of two fluids of different gravity, or by the dissolving of any salt existing in the fluid.

Observations are made less frequently with reflected than with transmitted light, but since the latter can only be used for very thick objects, the principal point to be gained in dealing with opaque objects, is to make such an arrangement of them, as to enable the observer clearly to make out their details. The manner in which the object is divided must be regulated and altered according to the nature of the object as well as the powers of the microscope. One is often helped by the microscope, to obtain respecting it. Firm homogeneous textures, such as wood, must be treated quite differently from delicate objects composed of different organs, such as buds and blossoms, in the case of wood it is sufficient to take as thin a slice as possible, cut in a certain fixed direction; in the case of buds and blossoms, attention must be paid not only to the direction, but also, particularly, to the point at which the section is made; it is necessary to examine the organ at several points, the stem, the leaves, the whole of the bud or blossom, and an equally accurate transverse section made at different heights, in order to ascertain the arrangement of the organs with respect to one another; moreover, the different parts of the organ should be separated and examined as separate elements; in cutting, and especially in inquiries connected with the development of plants, a dissecting microscope is necessary. The same remarks apply to hard and soft animal tissues.

Succulent or spongy tissues have generally large cells; it is not necessary therefore to have thin sections of such tissues, which are always difficult to make. Delicate animal tissues may advantageously be placed in spirit or pyrogene acid for some days, provided it is not necessary that the tissues should be examined whilst fresh; but there is little advantage to be derived from treating botanical objects in that manner. It is a good plan however, in many cases, to saturate delicate portions of animals and vegetables with thick gum spirit, which will prevent them being dissolved.

In dissecting, different methods must be adopted, according to the magnitude of the different objects; objects of large size may be held with the left hand, or with the thumb and forefinger of that hand; very small or thin objects, such as the stems of mosses, thin twigs and roots, leaves, small seeds, and such-like things, may be placed between two pieces of cork, and thin slices of the object cut by means of a sharp knife or razor.

The atmosphere is sometimes disagreeably impeded by the presence of air, which becomes accumulated in the hollow parts of the petals, in the intercellular canals, in the vessels; and in wood; it is best removed by placing the object for a few minutes in a small watch-glass filled with alcohol; when taken out of alcohol the object is transferred to the slide. When it is wished to examine the cell contents, in which the changes are generally produced by the operation of alcohol, the removal of the air may be advantageously effected by the use of the compressorium, which is provided for the purpose, whilst the observer looks into the microscope. In the absence of a compressorium, the fingers may be lightly pressed against the glass cover.

For transferring objects from one fluid into another a very fine capillary tube should be employed; needles and other sharp instruments should never be used for this purpose, since the object may be easily injured by them. When the object is very small it will be more easily found if the watch-glass is darkened up, and the object will then be visible with a much higher magnifying power. The microscope only affords a view of one surface of an object; when, therefore, bodies are subjected to examination, it is not sufficient for a correct understanding of them to examine one side only; a transverse section and a longitudinal section are necessary. The two sections in different determinate 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, in objects of small size, 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 Orchis, or grains of starch or pollen or eggs of insects, it is necessary to look at them from 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 perfect the microscope, the more the observer should be careful. The more sensitive is the instrument to any small alteration of the focus, on which account the observer should always keep his hand upon the fine-adjusted screw whilst he is employed upon observations requiring much accuracy. The sensibilities above mentioned increases, in good instruments, 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 the lines seen upon objects, or by the fineness and clearness of the outline, which should be soft, but well-defined. The scales of the *Hippocastanum* leaf, 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 strike to disappear.

In examining small round bodies, such as pollen-grains, the position of the object should be changed 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 slides, 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 compressorium, which is an instrument consisting of a mechanical arrangement by which the thin glass covering an object may be compressed at will. When the compressorium 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 compressorium 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 compressorium may be of service; since, if a cellular membrane be present, it will be compressed and displaced, whereas if 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 then to ask, What are its contents? We therefore, to what extent is it filled? Whether its contents are fluid with a solid substance contained in the fluid. Another question which arises is as to the nature of the fluid contained in the cells. It may be a homogeneous fluid, or of fluids of different consistencies, apparently not intermingling with one another; the manner in which 3 F
these fluids are affected by chemical re-agents has also to be considered. Lastly, the solid ingredients of the cell-contents, and their physical and chemical nature, must also be attended to.

There are some substances dissolved in the juices of the cell, such as sugar, for example, for which no certain chemical is given. Gum and dextrin, for instance, contain an intense yellow colour, almost brown, is produced. When the presence of oil or resin is suspected, the object should be placed in ether or pure alcohol for some hours, which will dissolve both oil and resin, and allow the inspection of the cell contents. Some re-agent must be used which operates upon the salt. Starch is detected by being coloured blue by iodine.

The following is a list of re-agents which it will be found convenient to have at hand in the examination of either animal or vegetable substances—

1. Alcohol, which is used principally for removing air from sections of wood and other preparations, and as a means of dissolving certain colouring matters, &c. It coagulates the albumen of animals.

2. Ether, which is principally used for dissolving resins, fatty essential matters, and other oils, &c. This is also useful for removing air.

3. A solution of caustic potash, which is used for the preparation of sections, is also useful in certain cases from its effects upon the contents of cells, and upon the thickening layers. It dissolves up substances of an albuminous nature. This solution often works better after warming.

4. A solution of iodine (one grain of iodine, three grains of gum or starch, one ounce of distilled water), for colouring the cell-membrane, and the contents of the cell.

5. Concentrated sulphuric acid. This is principally used for examining pollen and spores. In the examination of hairs it renders the cells very distinct.

6. Diluted sulphuric acid (three parts of sulphuric acid and one part water), for colouring the cells of plants which have been previously moistened with the solution of iodine. The object is moistened with the solution of iodine, which is then removed with a fine camel's hair brush, and by means of a glass rod a drop of sulphuric acid is added, and the object is then immediately covered with a covering-glass. The effect of the sulphuric acid and iodine, as well as that of the iodised solution of chloride of zinc, is not always the same over the whole surface of an object. At the points where the mixture is more concentrated, the colouring is more intense; frequently places remain without any colour. The colour changes after some time; in twenty-four hours the object is in red.

The iodised solution of chloride of zinc produces generally the same blue colour in cellulose as iodine and sulphuric acid: the former is preferable in many cases, inasmuch as its effect is not so rapid, and it is not injurious to the cells. Both re-agents are well known, and may be employed in their proper place, as compared with one another. Besides maceration, it is advisable, in examining woods, to adopt the plan of boiling this section for about a minute with a solution of caustic potash; after this boiling, the wood-cells, which were not previously turned blue by iodine and sulphuric acid, become a violet or blue colour upon the application of the iodised solution of chloride of zinc.

7. A solution of chloride of zinc, iodine, and iodide of potassium. This solution is boiled into an alkali until it is placed in a little water, produces the same colour as iodine and sulphuric acid. This solution was first recommended by Professor Schultze, of Rostock; it is more convenient to use than iodine and sulphuric acid, and produces almost the same results; it is, moreover, not so destructive as sulphuric acid.

The exact prescription for this solution is as follows:—Zinc is dissolved in hydrochloric acid; the solution is permitted to evaporate, under contact with metallic zinc, until it attains the appearance of vinegar; and the syrup is then saturated with iodide of potassium. The mixture is then boiled until it is perfect, and the solution, when it is necessary, is diluted with water.

8. Nitric acid, or, what is better, chloride of potash and sodium carbonate. This is used for separating cells. The method of maceration described in microscopic practice, and which is much to be recommended, is as follows:—The object (wood, for instance), is reduced in size to the thickness of a lucifer-match; it is then thrown into a long and tolerably-wide boiling-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 boiling-tube is withdrawn from the flame, the oxidising mixture is employed to work for about a minute and a half or three minutes, and the whole is thrown into a saccar with water; the small pieces which adhere slightly to one another are then collected, placed in the boiling-tube, and boiled repeatedly with alcohol, until the latter appears perfectly clear; the last they are then boiled out 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 boiling with nitric acid is always beneficial. The next step is the preservation of 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 silica, as in the case of the Devonian rocks.

9. Oil of lemons, 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) is useful for preparing microscopic objects; these solutions are also used for drying small things, even for delicate objects, unless they contain starch.

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.

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 glasses which exhibit lamination, for instance in the potash starch, the lamination is thereby continued 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 to be recommended for a few thin sections of wood, such as fossil woods. They both make the object more transparent than the solution of muriate of lime.

13. A tolerably strong solution of carbonate of soda in digesting root-wood, as well as hydrochloric acid for digesting fossil woods which have been converted into carbonate of lime. It is also recommended for examining the sweat-dots in the skin.

14. Acetic acid. This is very useful in examining animal tissues. It has the power of making the cell-wall clearer, whilst the nucleus becomes darker and more distinct. It also distinguishes phosphate or carbonate of lime from oxalate of lime, by dissolving the two former, whilst it has no effect upon 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 water.

18. Nitrate of silver in solution is used as a test for chlorides and phosphates. The white chloride of silver is soluble in ammonia, but insoluble in nitric acid. The yellowish phosphate of silver is soluble in excess of ammonia and nitric acid.

19. Oxalate of ammonia 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 require some of them to be added. The above list, however, comprises those which will be found most useful.

In addition to the ordinary arrangements of the microscope, some forms of accessory apparatus will be found very useful. Some of these will be alluded to, and the following will also be found convenient.

1. A spirit lamp, which may be made of brass, tin, or
glass, fitted with a ground 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 will be found of use for drying objects previously to 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. Microtome knives, those of about 1 inch and 1 inch 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 require a soft or fluid when placed upon a slide.

6. Needles of various sorts are useful for fastening down minute organic bodies which are about to be submitted to dissection.

7. Scissors of various sizes will be found serviceable. These may be obtained of the surgeon's instrument maker.

8. Knives, scalpels, and razors, for cutting soft or hard objects, should be kept at hand.

9. A small narrow box will be found convenient for placing thin glass on the slides, as well as for placing or removing objects from the slides.

10. A glass-cutter's diamond is useful for cutting slits of glass on the slides, and in writing the names of preserved objects on the glass slides.

Cements 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 edges of which they are placed, and for attaching the glass slides, and making minute dissections. Small handles may be attached to them, rendering them more easy to work. Needles or pins may be employed for fastening down minute organic bodies which are about to be submitted to dissection.

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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 cold water or tap water be used, a precipitate of some of the salts dissolved in it is sometimes produced, which takes 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 stronger spirit or alcohol is used. Two parts of proof spirit, about specific gravity ‘837, mixed with one part of pure water, makes a mixture of sp. gr. ‘916 to ‘930, which contains about 49 per cent. of real alcohol, and will therefore be about the strength of proof spirit. One part of alcohol, over-proof, to five parts of water, forms a mixture of a 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 litchuge. The oleate of lead remains as an insoluble plaster, while the glycerine is dissolved. It may be rendered free from lead by passing through the retort. After passing through it; 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 Desmodium; but it is also applicable to the preservation of animal substances.

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 remarked that M. Strauss-Durckheim 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.

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 sufficient 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 superfluous fluid, and filter it if necessary. Preserve it in well-corked or stopped bottles.

I have some large preparations which have been preserved in upwards of a pint of this fluid, for more than five years, and have remained perfectly clear and unaltered. Some dissectors of the nervous systems of insects have kept excellently—the nerves keeping their colour well, and not becoming at all brittle. Two or three morbid specimens are added, and 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 gutta percha cell, containing nearly a gallon of this fluid.

Solution of Chromic Acid.—A solution of chromic 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 crystallized acid in distilled water, to render the liquid of a pale straw colour.

The crystallized acid may be prepared by decomposing 100 measures of a saturated solution of bichromate of potassae, by the addition of 120 to 150 measures of pure concentrated sulphuric acid. As the mixture becomes cool, crystals of chromic acid, which should be dried and then 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.
Bottle of spirits . 6 ounces.
Spirits of Wine . 4 ounces.
Cresasote . 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 reduced to the strength of a syrup the creasote dissolved in the spirits of wine is to 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 cover, and the inclusion of air-bubbles must be carefully avoided.

Geoddy’s Solution.—

Sodium . 4 ounces.
Alum . 2 ounces.
Corrosive Sublimate . 4 grains.
Distilled Water . 4 pints.

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 diluted.

Burnett’s Solution.—This fluid has been patented. Its preservative properties appear to depend upon the chloric acid of zinc. A strong solution of chloric acid of zinc 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 chloric acid 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 (Schacht). A solution of alum in the proportion of 1 part of alum to 16 parts of water has been found to answer pretty well for some substances. Ganna’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, mercury, sulfidure of bismuth, arsenious acid, ortho phate 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. Arsenical hydrocyanic acid has also been recommended for the preservation of animal substances, but it is not adapted for microscopical preparations.

Canad 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 menstruum. 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 they may be floated on a pie of wooden forceps, or in a pair of common forceps, the tips of which are 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, but 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 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 still liquid, until a film has 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 containing the specimen between the plates of a slide, with 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 penetrating fumes of chloroform. Having 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 warmed, may then be taken in a pair of forceps, and, after being held over the warm 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 tissues containing blood-vessels, ducts, or 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 amount of fluid, of the consistency of honey, and, according to the color of the tissue, mixed with it, is injected. The following general rules for injection are given by Dr. Beale:—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 injecting-cans should be carefully covered, 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 to allow for this treatment, there are 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, which will gradually destroy the rigor mortis just 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, mollusces, &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 morning, and only a short time before death. 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, 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 connected with a cannula balance, and two or three times 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 expand, and may be allowed to come out of the accidental of the piston, before any of the latter is forced into the vessel. The end of the syringe is then to be pressed firmly into the upper part of the stopcock, 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, in which it may be in it may remain in the upper part; and, for the same reason, all 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 case of fluid having 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 a force is employed, extravasation will be produced before the capillaries are filled. Gentle pressure, 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 are we to succeed.

In order to examine the structure of many tissues, it is necessary to obtain a section sufficiently thin to permit the transmission of the light readily, and so evenly cut, that 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 often very great, and, to effect it, it is necessary, besides the usual mechanical operations becomes necessary. Sometimes we require to cut a thin section of a soft pulp texture, which can scarcely be touched without injuring its delicate structure, and altering the position of its constituents; while, in other instances, we have only a very small portion of a 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 organ in water for a few moments, 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 enable us 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 a spirit-lamp. In this way we wish to get rid of the soft and more pulpy part of a tissue, in order to subject the more dense and fibrous portion to examination. This object is usually effected by soaking the tissue in water for some little time, which then produces a condition known as ‘softening‘, which means the softer portions are gradually washed away. Soaking 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 pulp portions can be got rid of. In this way we may demonstrate the supporting or trabecular tissue of the apleen, and the areolar and vascular tissue of the liver, &c. Thin sections of kidney, liver, and other organs, can be obtained in a similar manner, 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 we may prepare specimens of skin, mucous membrane, and many other tissues, which 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. This drying may be speeded up by exposing it for a short time, in which case, when subject to examination, it will be often found to have regained its first appearance. Portions of muscular fibre, the tongue, skin, and many other tissues, can be much advantageously prepared in this manner, as they may be cut off with a sharp knife readily obtain exceedingly thin sections, which 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, and granules of siliceous matter are removed. The organic material with which they were combined. The beautiful siliceous shells of the Distomaces may be separated from organic matter by a similar process. The ignition should be carried out in a small platinum boat, or upon a small piece of platinum foil. 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 very perfect state. To the best of our power, this process can be carried out without the least injury to the shells, or the organic matter contained, 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 while the product of the turgescence in Canadian balsam. In 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 siliceous 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 the knife or scalpel, is placed on the centre of the drop of clean water is then added, and the whole covered with a square of thin glass, also perfectly clean. If the surface of the thin glass be gently breathed upon, it becomes very nearly dry. The slab may then be revellled 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 pumpy 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 directed 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 make them thin enough for the object to be seen by transmitted light. Many hard substances, such as nail, horn, and dried animal textures, may be cut with a strong sharp knife, or with a razor; 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 Canadian balsam, as occasion may require.

Blacksmiths, tool-makers, and fossilised rocks, should be first cut into very thin sections with the aid of a sharp saw. These sections should then be pared down to the necessary thinness upon a hone or smooth stone. This may be effected in the following manner:—The section, after having been cut with the saw, is placed on the ground, and 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 tenuity. 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, or 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. As a matter of fact, it is imbedded in the section slightly in a piece of warm gutta percha, which should extend only over a very short distance beyond the edges. This is to be rubbed up and down on 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 thin. The section may also be ground down expeditiously by rubbing it between two hone. If very thick, it will be better to reduce it somewhat with the aid of a flat file, and commence the grinding. After being ground to what is considered the proper thickness, 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 removed by polishing the specimen upon a very smooth part of the hone quite dry.

Tooth 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, by iron wheel, the edge of which is dressed with diamond dust.

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, mounted with water, turpentine, or Canada balsam. In examining 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 after. The cartilage becomes very soft in ten days, or more. A strongly acid will become soft in four or five days, when thin sections of different parts may readily be cut with a sharp knife.

The denticial tubes may be isolated from each other by loosening them from one another, and changing the fluid for a few hours in dilute caustic soda or potash. It is better in this investigation to cut the thin section before macerating 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 sulpharic 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 a drop of the fluid on the middle of a slide, and cover it with a square of thin glass. It frequently happens however that it is the matter suspended in a fluid that it is desirable to examine. Under these circumstances the fluid should be placed in an ordinary test-tube, and after allowing the deposit to settle, 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 a fluid the deposit should be placed under the microscope, and the contents of the bag placed on the slide. In this way the Desmidaceae and some of the larger Foraminifera are best procured for examination.

When the quantity of deposit is very small, 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 deposit from the orifice of the pipette, a small drop of the glass slide is placed under the petri-dish, 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. Air tracts of deposit will subside to the lower part of the fluid, and by allowing the air to escape it will be possible to place 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 size of which is neither 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 with advantage be submitted to examination with the microscope, there is none of more importance than the urine. The fluid being the great means 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 examined 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 without delay 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 decomposed.

In other instances, the urine does not appear to undergo
Acetic acid causes the membrane of the corpuscle to become more transparent and clear, and to swell up from endosmosis. After the application of this re-agent the blood-corpuscle may be seen to be invisible, but not 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 semi-transparent, and then again soluble in ammonia and alkalies. They are rendered darker, and the walls corrugated, by the acid 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 infused into the stomach, and the dark smoky hue 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 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 be retained. Whenever it is possible, it is preferable to use desribinated blood. Often the corpuscles and a little serum may be removed from the clot by firm pressure, and from this very perfect crystals may frequently be obtained. The blood-corpuscles become ruptured, their contents escape, and the crystal lies 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 specimens of blood. Crystals may also be obtained in a similar manner from urine.

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 that most commonly obtained from the blood of man, the Carvuscoro, and fishes. Tetrahedral crystals appear most common in some of the Rodentia, as the guinea-pig, while six-sided tables are formed in the blood of the squirrel, mouse, and some others. Teichmann has succeeded in obtaining crystals in addition to 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.

Guinea-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, on the addition of the same, only crystallises when just removed from the body, but more quickly if the blood has been drawn a few hours.

It is obvious from what has been said above that the microscope is one of the most important instruments of the pathologist. The method of research that it permits the character 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 the blood 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 pressed down until a very thin, transparent, and almost colourless stratum only remains. In this manner the individual globules cannot be seen distinctly, a little syrup or serum must be added; but it is better to avoid this, as the red corpuscles may be lost in it. Upon focussing, 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 seen.

If a little strong syrup be added to a drop of blood, the corpuscles will be found to have become flatter from exosmosis of a part of their contents; while, on the other hand, if placed in water, they become spherical from endosmosis, and contain nearly the same amount of similar 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.
part of the gentle-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 lipidic tissues, has led to the supposition that the properties become changed, and their functions impaired, or altogether destroyed, and 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 lend force to this supposition. It is well known that the consequences of arteriosclerosis depend upon complicated changes affecting nutrition, than upon the presence of a condition of plethora or hyperemia, as was formerly supposed and acted upon.

"The connection between fatty degeneration of the margin of the cornea (arcus 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 microscopist.

"The microscopic examination of the matters vomited in certain cases has proved to us that the presence of minute fungi, originally discovered by Professor Goodair, and named by him *Saccharoma ventriculi*, occurs in connection with the mucous membrane of the stomach. These remarkable cases are much more frequently met with than was formerly supposed, and form an exceedingly interesting class of diseases. [Entomotyza, S. 2.]

"For the detection of Impurities in Food and Drugs the microscope is of the greatest importance and aid, and there are several other purposes to which it may be applied.


MIDDLESBOROUGH. [YORKSHIRE.]

MIDDLETOWN. [DURHAM; LANCASHIRE.]

MIDDLETOWNITE. [MINERALOGY, S. 1.]

MIDDLETOWN. [CONNECTICUT.]

MIDDLETOWN. [ROCKISHER.]

MIDDLETOWN, county of Cork, Ireland, a post- and market-town, and the seat of a Poor-Law Union, is situated near the head of the northern branch of Cork Harbour, 51° 05' N. lat., 8° 15' W. long., 134 miles by Cork by road, and 1744 miles by S.W. by N. from Dublin. The population in 1851 was 3676, besides 2334 inmates of the workhouse. Middletown Poor-Law Union comprises 19 electoral divisions, with an area of 109,286 acres, and a population in 1861 was 3270. Middletown consists mainly of a spacious and well-built street between the Avoncharia and Roxborough rivers, terminating at each end in a bridge. In the town are a vestry church, a Roman Catholic chapel and nursery; a Free Church school, founded by the Society of Friends in 1822, by the Pipers in 1833, and by the Wesleyans in 1837, with 20 scholars in 1852, two National schools, a court-house, a market-house, a bridewell, a fever hospital, and a district dispensary. There are also distilleries, breweries, corn-
Vessels of 300 tons ascended to Bail-lick, within half a mile of Mildeston; and at the port of Ballincurla, about a mile below the town, large ships are made of corn and other provisions. Quarter and petty sessions are held on every Thursday at Boxford, July 6th, October 10th, and November 22nd. The town and neighbourhood are the property of Viscount Mildeston.

MILBOURNE. [Somersetshire.]

MILBOURNE CASTLE. [Somersetshire.]

Military and Naval Forces. Under 'Great Britain,' in Penny Cyclopedia, vol. xi., p. 490, the state of the army and navy of the United Kingdom, in 1838, 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, 1858), 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 affor ded for frequent fighting and increasing demobilization 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, while 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 greatly exceeded even that of the most deleterious and dangerous trades, was the ill-constructed and crowded state of the barracks. In March, 1858, General Peel, the Secretary for War, announced that surveyors 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 financial year, was 33,940,704. The troops in the East Indies, who amounted to 28,583; the number of the non-effective service was 2,000; the estimated charge was 34,195,041/; an increase of 30,378 men, and 2,595,077/ of charge, over the preceding year. The revised estimate was subsequently reduced to 30,240,964/.

For the year ending March 31, 1858, there were voted 125,756 men, with 11,786 horses, a decrease of 119,920 men from the preceding year. The troops in the East Indies had increased to 30,157, with 2,812 horses.

For the year ending March 31, 1859, the estimate was as follows:

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<th>Officers</th>
<th>Non-Comm. Officers</th>
<th>Rank and File</th>
<th>Total</th>
<th>Horses</th>
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<td>99</td>
<td>105</td>
<td>1035</td>
<td>815</td>
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<td>90</td>
<td>1428</td>
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<td>870</td>
<td>2078</td>
<td>2414</td>
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<td>6600</td>
<td>850</td>
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<td>925</td>
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</tbody>
</table>

There are three regiments of Life Guards and Horse Guards, one battalion of Horse Artillery, 7 regiments of Dragoon Guards, and 16 regiments of Dragons according to the Army List (1 to 17, the 6th having been disembodied), but the estimates provide for 18 regiments, the 5th being restored; one regiment of Royal Artillery, one of Royal Engineers, a medical Train, a Medical Staff, and a Commissariat Staff. The Infantry of the Line consist of three regiments of Guards, 99 foot regiments, and a Rifle Brigade. There are three West India Regiments, and seven Colonial Corps.

In Jan. 1858, according to the Army List, there were 4 Field-Marshals, 67 Generals, 89 Lieutenant-Generals, and 290 Major-Generals.

At the beginning of 1837 the army of the East India Company, independent of the Queen's troops, amounted to about 390,000 men. Here 34,630 were cavalry, and the 74,920 artillery, horse and foot, with 516 pieces of cannon. The European officers of this force numbered 6215.

This was, of course, before the breaking out of the Indian mutiny. The Bengal army mutinied almost to a man, and what remains of that force is now (April, 1858) in arms against us. Some disaffection has also probably decreased the numbers of the Madras and Bombay armies. On the other hand, the number of royal troops has been greatly increased; but so many are on passage or their passage, or under orders to proceed thither, that it is not possible to state the precise numbers. On the whole an addition, from home and from some of our colonies, of more than 50,000 has been forwarded to India, though incessant fatigue, the climate, and frequent disease, have so much diminished the efficiency of the men. The Queen's troops in India for 1856-9 are estimated as follows:—

<table>
<thead>
<tr>
<th>Officers</th>
<th>Non-Comm. Officers</th>
<th>Rank and File</th>
<th>Total</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Horse Artillery</td>
<td>96</td>
<td>54</td>
<td>728</td>
<td>609</td>
</tr>
<tr>
<td>Cavalry of the Line</td>
<td>440</td>
<td>619</td>
<td>729</td>
<td>2217</td>
</tr>
<tr>
<td>Royal Artillery</td>
<td>225</td>
<td>329</td>
<td>2001</td>
<td>700</td>
</tr>
<tr>
<td>Royal Engineers</td>
<td>19</td>
<td>22</td>
<td>448</td>
<td>400</td>
</tr>
<tr>
<td>Royal Marine Artillery</td>
<td>232</td>
<td>454</td>
<td>68,000</td>
<td>64,940</td>
</tr>
<tr>
<td>Military Staff Corps</td>
<td>243</td>
<td>451</td>
<td>8000</td>
<td>7000</td>
</tr>
<tr>
<td>Medical Staff Corps</td>
<td>95</td>
<td>95</td>
<td>11,908</td>
<td>10,840</td>
</tr>
</tbody>
</table>

The amount voted for the year ending March 31, 1857-8, was 11,443,236/; for 1858-9 it was 11,750,000/. Of this in the first year 4,385,017/, and in the last 4,361,092/, were expended on regiments and staff payments, and allowances, but 680,000 in the last year was to be paid by the East India Company on account of the excess of number of men sent to India.

The amount voted for the Embodied Militia for the year ending March 31, 1859, was 650,000/; and for Volunteer Corps, 80,000/; for 1868 the amount had become 60,892/.

The sum expended on the effective service of the army in 1857-8 was 9,321,092/; the estimate for 1858-9 was 9,285,319/; on the non-effective (pensions, rewards, and allowances,) 2,221,875/ and 2,240,068/.

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 6722 guns, and 202 steam vessels carrying 6505 guns, besides 160 gun-boats. These were manned by 42,776 men, including officers, and there were in addition 16,000 marines.

In Jan. 1858 there were in commission 648 vessels of various sizes, sailing and steam-propelled vessels, mounting 15,716 guns, and 120 steam-steam-masted 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 of the guns.


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 and commandant, 5 colonels and second commandants, 19 lieutenant-colonels, 130 captains, 176 lieutenants, and 50 second lieutenants. There are also depots of Marine Artillery, with 1 colonel and second commandant, 2 lieutenant-colonels, 14 captains, 37 first lieutenants, and 9 second lieutenants.

The total expenditure on the navy for the year ending March 31, 1857, was 14,644,514, an amount less by 1,904,100 than that of the estimate of the gross sum. The vote for 1858-9 was for 44,380 seamen, including coast-guards, &c., and 15,000 marines; the estimate of the expenditure was 9,680,000, 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 in the following table:

<table>
<thead>
<tr>
<th>Country</th>
<th>Navy</th>
<th>Foreign Service</th>
</tr>
</thead>
</table>
| Austria         | 84 regiments of infantry,     | 14 frontier regiments, | 56,320 men: 23 battalions of light infantry, numbering 23,534 men; with a division or depot of light infantry, numbering 6,884 men. The cavalry consisted of 8 regiments of cuirassiers, 8 of dragoons, 12 of husars, and 12 of uhans, amounting in the whole to 70,376 men, with 60,784 horses. The artillery numbered 58,614 men, with 1,544 pieces of cannon and 10,000 staff corps officers, 1,162 men; there were 6 batteries of pioneers, numbering 9,217 men, with 3,880 horses; and 20,000 gendarmerie (these are the armed police), in 12 regiments. There are also many other military establishments, such as the military schools, with 1,029 professors and other petty officers, 2,487 men, and 21 depots, with garrison and frontier battalions, &c. The Austrian navy numbered 101 vessels, including 62 gun-boats, and 9 transports, the whole carrying 950 guns. It contains one vessel of 100 guns, 5 frigates, carrying together 165 guns, 3 screw-steamer frigates, carrying 125 guns; the remainder are corvettes, brigs, and smaller craft. The population, at the end of 1854, was 39,411,309, exclusive of the military.

Bavaria had 154,526 infantry; 28,879 cavalry; 24,700 artillery and pioneers; 9,000 marines, and 6,000 gendarmerie; 28,000 men, with 90 pioneer corps, 12,000 horses; 12 battalions of cavalry, and 14 battalions of infantry. The force also consists of 3,000 men of the Rhine, 54,000 infantry and 2,000 cavalry. The population was 4,541,595.

Belgium possessed an army of 16 regiments of infantry, numbering 66,350 men; 7 regiments of cavalry and gendarmarie, numbering 8,502 men, with 7,855 horses; 4 regiments of artillery, numbering 7,600 men, with 152 pieces of cannon; one regiment of engineers, numbering 1,690 men; and a communication corps, numbering 1,000 men, is the gendarmerie establishment, and forms in effect a total force of 100,000 men when on a war footing. The population was 4,630,928.

For Denmark the number of men is not stated, but in time of peace it has a general staff, a corps of engineers, 2 regiments of artillery and pioneers, 90 pioneer corps, 12,000 horses; 12 battalions of cavalry, and 23 battalions of infantry. There besides a corps of reserve, composed of cavalry, infantry, and artillery. The navy numbered 119 vessels, mounting 913 guns, of which 4 are ships of the line, and 11 are steam-vessels, carrying 135 guns; of the remaining, 67 are gun-boats, 17 transports, and other small vessels. In 1856 the total population of Denmark, together with Schleswig Holstein, and other dependencies, was 2,600,000.

In France, the infantry of various sorts numbered 220,268 men, the cavalry 69,988, the artillery 34,582, the gendarmerie 22,719, the engineers 9068, the staff 4345, the military train 4971, the veterans 1135, military interands 1029, the foreign body (Algiers) 6011, riflemen and indigineous cavalry (Algeria) 6767: a total of 378,015 men. In 1856 the total number had amounted to 677,836 men, of whom there were in France 310,347, in Africa 64,253, engaged in the war in the East 197,597, and in Italy 62. The navy in 1857 consisted of 263 vessels, of which 10 were of 190 guns each, 10 of 100, and 5 of 80; there were 50 frigates of from 60 to 40 guns each; the rest were smaller vessels, corvettes, brigs, and a few steam-vessels of lesser size. The population was 36,039,364.

Hanover had a total land force of 29,535 men, of which 20,464 were infantry, 3078 cavalry, 257 engineers, 2866 artillery, 441 gendarmerie, and 33 staff officers. The population was 1,515,777.

Netherlands had 15,600 men of an army amounting in the whole to 143,588 men. Of these 74,914 were infantry, 6736 were cavalry, with 6000 horses; 6322 were artillery, with 1347 horses; 2850 were engineers. These formed the active army, and there were in reserve 45,400 infantry, and 300 cavalry. In the fleet there were 105 ships, altogether 833 guns; there were 2 ships of the line, 5 sailing and 14 steam frigates; there were 50 mortar and gun-boats, and other small vessels. The total population of the Two Sicilies amounted to 7,126,457. The army of the Netherlands amounted to 58,495 men, of whom the infantry, including the staff, numbered 43,583 men; the cavalry 4480; the engineers 685; the artillery 6807; a corps of pontoniers, numbering 213; and 5 companies of gendarmerie. The navy consisted of 6 ships of the line, 5 frigates, some of them steamers; 16 smaller warsteamers; 68 gun-boats; the remainder were smaller craft. The total carried 1934 guns. The population of the Netherlands, exclusive of the colonies, was 5,647,517. The army of the United States consisted of 11,984 men, with 3484 men of the navy, 9,410 cavalry, with 1368 horses, 1524 artillery, with 199 horses, and 840 pieces of cannon; and 290 engineers; these, with the staff, sanitary corps, &c., make a total of 20,620 men in active service; and there are also municipal police, veterans in retirement, and others, with a reserve of 4996, making a total of 31,845 men. These were independent of 17,253 men, forming the armed forces of its foreign possessions. The navy consisted of 59 vessels, of which 5 were disarmed, and 5 were adverse to the general movement; the remainder consisted of 55 vessels, carrying 398 guns, and 3,600 men. There were 9 sailing frigates carrying 36 guns, 2 steam-frigates carrying 21 guns, 36 gun-boats with two guns each; the rest small vessels, some of which were steamers. The population in 1856 was 17,822,531, in which you may include 8 regiments of engineers, &c., forming a principal part of the light cavalry, numbered 127,800 men. The navy was divided into four divisions: the Baltic fleet, the White Sea fleet, the Black Sea fleet, and the fleet of the Pacific Ocean. The first consisted of 6 sail of the line, 3 frigates, and 20 other ships; the second consisted of 55 vessels, carrying 3 steam-frigates, of which the number of guns is not stated; the second division consisted of 6 sail of the line, mounting 496 guns, and 8 frigates, of which the armament is not given; the third division consisted of 5 sail, but of these 3 guns is not given; and the fourth division consisted of 8 sail of the line, mounting 690 guns, 5 frigates, and 2 steam-vessels. There were also a considerable number of gun-boats, both rowing-boats and steam-boats. The total population of the empire of Russia in 1856 was 58,937,437.

In Sardinia the army consisted of 29 regiments, numbering 36,410 men; 10 battalions of riflemen (Bersaglieri), with 3657 men; 9 regiments of cavalry, with 5175 men, and 4309 horses; 3 regiments of artillery, with 4200 men, and 1302 horses; 2 corps of engineers, with 1500 men and 295 horses; and 3901 men of the gendarmerie. There are other military bodies, such as guards of the palace, invalids, &c., bringing up the total to 45,273 men. The army consisted of 4 artillery and 4 steam frigates, 4 corvettes, 3 brigantines, 1 brig, 10 steam-boats, &c., in all 40 vessels of war, with 900 guns. The population, including the continental possessions, with Sardinia and Cags, was, in 1848, 4,916,084. Spain had 75,017 infantry troops; 18,894 cavalry, with 7993 horses; 10,635 artillerymen, with 1870 horses; 2786 engineers; 10,717 gendarmerie, with 2000 horses; and
303 provincial guards in the Canaries; a total of 119,629 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 consider- 
sible number of forces in Cuba, and other foreign posses-
sessions. The navy consists of 31 sailing ships, and 49 steam-vessels; there were 3 ships of the line, 10 frigates, ranging from 42 guns to 2 guns; 5 corvettes, 11 brigantines, &c., besides 110 gun-boats, &c. There are also a large number of gun-boats, &c. The total number of men on board the ship was 15,177. The population of Spain in 1856-7 was nearly 17,000,000.

In Sweden the military force is somewhat smaller. A part of the army is in barracks, and has been for six years, while another part (called Indelta) are cantonised in different places, and are paid by the owners of estates, and partly by the crown; having also a house and some ground furnished to each man; during war they are paid wholly by the crown, and in peace they are assembled once a year for four weeks to be exercised and reviewed; a third part consists of the militia of Othland, who are only available for home service; and the fourth part consists of the troops raised by conscription, to which every Swede between 30 and 55 years of age is liable. The total force thus composed amounted to 144,013 men. The enrolled troops form 3 regiments of infantry, 2 of cavalry, and 3 of artillery, and number altogether 7625 men, exclusive of officers; the canton troops number 6036 in their past, and 1202 in the present state; the 7625 men; and the troops raised by conscription number 95,295 men. Norway had a military force of 11,924 men, 1070 cavalry, 1330 artillery, with 9160 of the landwehr, 226 navy vessels of various sizes; it had 10 vessels of the line, 6 frigates, 3 corvettes, &c.; but its greatest strength consisted of a swarm of gun-boats and vessels of a similar character, there being 694 row-boats, besides 77 shallop, and 125 yaws carrying guns. The navy of Norway consisted of 11 vessels, mounting 450 cannon; of these 3 were frigates, 4 corvettes, 125 gun-boats, &c. The maritime conscription amounted to 46,000 men. The united population of Sweden and Norway in 1855 was 5,076,000. Switzerland the army consisted of 106,000 men, of whom 76,000 formed the regular army, and 32,000 the reserve. The regular army comprised 74 battalions of infantry, 45 companies of riflemen, 39 companies of cavalry, 40 companies of artillery, and 9 companies of engineers. The population of Switzerland in 1850 was 1,417,754.

Turkey had an army comprising 100,800 infantry, 17,250 cavalry, 7800 artillery, with 5200 additional in fortresses, 1600 engineers, 16,000 detached troops in Candia, Tripoli, and other places, 16,500 men to be raised, and 3000 men of the reserve of 128,880 men. The navy in 1853 comprised 70 vessels, manned with 34,000 seamen, and 4000 marines. The population of Turkey in 1854 (the latest total) was 26,680,000. Switzerland had on the peace establishment, 6149 infantry troops, 1729 cavalry, and 1562 artillery, engineers, &c., making a total of 9683 men; on a war establishment these can be raised to 22,018. The population of Wurttemberg in 1855 was 1,603,729.

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 15,526 men; but in addition, the militia amounted to 20,000 men. The navy consisted of 74 vessels, mounting 2944 guns. There were 10 sail of the line ranging from 130 to 84 guns; 13 frigates ranging from 50 to 50 guns, most of the guns of large calibre, and many of the vessels propelled by and of most excellent construction. The population of the United States in 1836 was 27,601,708.

MILITARY PUNISHMENTS. The policy which has been pursued of late years in modifying the punishments prescribed by the criminal codes has been extended to those which may be inflicted by courts martial for military offences. One material alteration consists in the limiting of corporal punishments; the utmost extent to which flogging can now be carried is 200 lashes. See Articles on MILITARY TRIBUNALS.

MILITIA. The qualifications of the officers of this constitutional force are now regulated by the Statute 18 & 19 Vict. c. 60. There have been of late years several statutes, modifying in other details the law relating to the militia, which it would 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 12th of Octo-
ber, 1809. 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 which he lost his life, and in which he was yet a child. In a work entitled 'My Schools and Schoolmasters, or the Story of my Education,' he has given not only an interesting account of his own life, but that of his father, and many of the members of his family. He received his first education at the parish school, and was 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 master. 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 was diligently studying the traces they exhibited of the animal life in which he indulged himself; and finally he became the historian of the Old Red-Stonebed, amongst the rocks of which he principally worked. His first literary efforts were not however directed to geology. He devoted himself to the mass, and was induced, by the refusal of a schoolmaster to publish, to devote his powers to the composition of a work to which has since been applied the name of 'Inverness Courier.' His first distinct prose publication was entitled 'Scenes and Legends of the North of Scotland.' Although the subject 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 discus-ion which terminated in a rupture of the Scotch church. His subject was one of vital importance to the Scotch people in the right. Lord Brougham and Vaux, on the opinions expressed by his lordship in the 'Auchterarder case.' This letter, which was referred to by Dr. Gladstone in his 'Church Principles, as the 'elegant and masculine production of C. H.' was published 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 Edinburgh in 1834. Sir Charles Lyell, Sir Roderick Murchison, and Dr. Buckland, were amongst the first to express their 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 volumes 'as the most valuable description of the United States.' Mr. Miller, after its discovery. 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 clear, and treated of the subject in a peculiarly attractive manner. It has had a very large sale, and still 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 the time of its pub-

3 G 2
sensitive to touch, but not so much so as the following species.

**M. pedicosa** has a prickly herbaceous stem, with petioles and peduncles more or less beset with stiff hairs or bristles; leaves somewhat digitately pinnate, with 4 pinnae, each pinna bearing many pairs of linear leaflets. It is a native of Brazil, as are several other species of Mimosa under the name of Sensitive Plant, the leaves falling on the slightest touch. The roots of this plant and its allies emit a most offensive smell, resembling the odour of a sewer at the time of impending rain. The leaves of *M. sepomans*, according to Willd., form a considerable article of commerce in India on account of their saponeous qualities. **Saponeous Plants.**

**MIMOMITIC ACID.** (Chemistry. S. 2.)

**MIMOSA** is a genus of Plants belonging to the natural order Scrophulariaceae. It has a tubular calyx, 5-angled and 5-toothed; corolla ringed, upper lip 2-lobed, lower one trifid, usually bigibbous at the base, segments all flat; stamens 4, didynamous, inclosed; cells of anthers diverging or divergent, at length subcordate; stigma bilaminar, capsule hardly furrowed, 5-valved, valves entire with flat margins, dissepiment at length free; placenta adnate. The species are erect or procumbent, glabrous, rarely villose, herbs, with usually tetragonal stems; leaves opposite, usually toothed. They are distributed in a large and varied area of South America, genus of the tribe, Fabaceae, pedicellate, superior ones sometimes racemose.

**M. latens.** Yellow-Flowered Monkey Flower, has leaves closely toothed, lower ones on long petioles, ovate or some-

what heart shaped, stem with calyx ovate, but campylnulate in the fructiferous state, with ovate-acute teeth, the upper tooth larger. It is a native of Chili. Babington says it has become naturalised in Great Britain. The corolla is yellow, with a dark mark in the middle.

**M. moschatus.** Musk-Scented Monkey-Flower, has diffuse stems clothed with woolly villi; leaves petiolate, ovate or ovate-lanceolate, a little toothed, rounded at the base, rather acute at the apex, and somewhat clammy; calyx tubular, but oblanceolate in the fruit; petal usually with 6 in number, 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, alternated with stamens, and 4 or 5 in number; ovary united, 2-celled; berries 4-seeded from abortion. The species are common in marshes, with alternate quite-entire glabrous coriaceous leaves, and axillary fascicles of 1-flowered pedicels. The flowers are small and yellow. The plant is diffuse, rooting at the base.

**Mimus.** [Mocking Bird.]

**Mimusops**, a genus of Plants belonging to the natural order Sapotoceae. It has a calyx 6- to 8-parted; segments disposed in a twin order; corolla with a double row of segments, 6 in number, 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, alternated with stamens, and 4 or 5 in number; ovary united, 2-celled; berries 4-seeded from abortion. The species are common in marshes, with alternate quite-entire glabrous coriaceous leaves, and axillary fascicles of 1-flowered pedicels. The flowers are small and yellow. The fruit is edible.

**M. elonga** has ovate-lanceolate or oblong leaves, acuminate, 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 leaves are said to produce an extraordinary noise when burnt.

**M. kaki** has obovate leaves, very blunt, silvery or hairy beneath, and acuminate at the apex; leaves numerous times as long as the petals, coiled at the ends of the branches; flowers fascicled, hexandrous. It is a native of the East Indies and Australia within the tropic. The tree yields a gum, and the fruit has a sweetish taste, and is much eaten by the natives of India.

**Minahead. [Some Perturbation.]

**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. It is the art of distinguishing mineral substances, and the science for supplying accurate descriptions of minerals, and forming what may be termed a natural classification; and an art in reference to the arrangement of the descriptive characters for the purpose of afterwards distinguishing minerals from each other. Mineralogy then must be considered as including 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; Haly divided minerals into acidiferous earthy substances, earthy substances, non-metallic combustible bodies, metallic bodies, substances not sufficiently known to admit of classification, rocks, and volcanic products. In Phillips's 'Elements of Mineralogy,' the classes are earthy minerals, acidiferous earthy minerals, acids, acidiferous earthy minerals, acidiferous alkaline minerals, native metals, metalliciferous minerals, and combustible minerals. Berzelius 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,' &c: —

Class I.—Simple bodies, or Binary Compounds never bases, generally essential ingredients in combinations, and serving as proximate elements.

2. Carbon. 5. Selenium.
3. Silicon.

Class II.—Alkaline Salts.

2. Salts of Potash.

Class III.—Alkaline Earths, and Earths.

Group 1. Salts of Barytes. 4. Salts of Magnesia.
2. Salts of Strontia. 5. Salts of Yttria.

Class IV.—Silicates.

Group 1. Anhydrous Aluminous Silicates.
2. Hydrous Aluminous Silicates.
3. Silicates of Alumina and Lime, or their isomorphs.
4. Aluminous and Alkaline Silicates, and their isomorphs.
5. Hydrous Aluminous Silicates with Alkaline and Lime bases, and their isomorphs.
   a. With Lime as a base.
   b. With Zircon as a base.
   c. With several bases.
7. Silico-Aluminates.
8. Silico-Fluorates.
10. Silico-Titanates.
11. Silico-Sulphurates.

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 Fritone.

1. Salts of Ammonia. 5. Salts of Strontia.

Class VI.—Earthly Minerals: Silica and Siliceous or Aluminous Compounds of the Alkalies and Earths.

1. Silica. 5. Glucina.
3. Magnesia. 7. Thoria.
4. 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 the merely 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, mammellated, nodular, stalactitic, 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 thin lustre very strongly, and each is often called satin-spar. Reticulated: 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. Stiblite and gypsum are examples.

Radiated divergent: when the crystals radiate from a centre without producing stellar forms. Examples, quartz, gray antimony.

In the Lamellar Structure the laminae or leaves may be thick, or very thick; they sometimes separate easily, and sometimes with great difficulty. When the laminae are thin and separate easily, the structure is said to be Foliacceous. Mica is a striking example, and the term Micaceous 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 diaspore. 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 Frangible.

Massive minerals also take certain imitative shapes, not peculiar to the regular varieties of structures. 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 Implantated Globules.
Reniform: kidney-shaped. In structure, they are like globular shapes.

Botryoidal: when a surface consists of a group of rounded prominences. The prominences or globules usually consist of fibres radiating from the centre.

Mammillar: resembling the botryoidal, but consisting of larger prominences.

Bread-crust: thread.

Acicular: slender like a needle.

Stalactite: 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 caverns; 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.

Boiled-up: net-like.

Drusy: a surface is said to be drusy when covered with minute crystals.

Amorphous: shapeless: having no regular structure or form, either crystalline or imperfect.

Crystals are also called Pseudomorphous. 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, calcite may under certain conditions of temperature and pressure change to stilbite, 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 a chemical change occurs, another mineral is substituted; for example, when cubes of fluorspar are transformed 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 fluorspar by quartz; and when the fluorspar is afterwards dissolved away, as sometimes happens, hollow cubes of quartz are left.

The first kind of Pseudomorphs are Pseudomorphs by Alteration; the second, Pseudomorphs by Replacement; the third, Pseudomorphs by Infiltration; the fourth, Pseudomorphs by Incrustation.

Pseudomorphous crystals are distinguished by having a different structure and cleavage from that of the mineral limited 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 slowly, and are of great importance in determining the results.

The characters 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, Diaphaneity; 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 sub-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. Opal and sinterblende are examples.

Pearly: like pearl. Talc, native magnesia, stilbite, &c., are considered as pearly. It is exhibited 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, 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-Adamasin. Varieties of white lead-ore are examples.

The degrees of intensity are denominated as follows:—

Strong: when the surface reflects light with great brilliancy, and gives well defined images. Illa iron-ore, tin-ore, some specimens of quartz and pyrites are examples.

Miling: when an image is produced, but not a well-defined one. Granular spar, and celestine are examples.

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 appears as if from points scattered over the surface. Flint and chalcedony are examples.

A mineral is said to be Dull when there is a total absence of lustre, as chalk.

In disintegrating minerals, both the external colour and the colour of a surface that has been rubbed or scratched, are observed. The latter is called the Streak, and the powder abraded, the Streak-Powder.

The colours are either metallic or non-metallic. The Metallic are named after some familiar metal, as copper-ore, bronze-yellow, brass-yellow, gold-yellow, steel-gray, lead-gray, iron-gray.

The Non-Metallic colours used in characterising minerals, are various shades of white, gray, black, blue, green, yellow, red, orange, purple, burgundy.

There are thus snow-white, reddish-white, greenish-white, milky-white, yellowish-white; bluish-gray, smoke-gray, greenish-gray, pearl-gray, ash-gray; velvet-black, greenish-black, black, blue-black; azure-blue, violet-blue, sky-blue, indigo-blue; emerald-green, olive-green, oil-green, grass-green, grass-apple, blackish-green, pistachio-green (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, scarlet, hair-brown, red-brown, reddish-brown, 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 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 quartzes.

Tarnish: when the surface-colours differ from the interior; it is the result of exposure. The tarnish is described as friezed, when it has the hues of the rainbow. It is also called Labradorescent, from 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 loilit, 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 polychroism.

Diaphaneity: 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 diaphaneity. The following terms are used to express the different degrees of this property:—

Breached: is said to be transparent when the outlines of objects, viewed through it, are distinct. Glass and crystals of quartz are examples.

Sub-Transparent, or Semi-Transparent: when objects are seen through it, but the outlines of objects are indistinct.

Translucent: when light is transmitted, but objects are not seen. Lace-sugar is a good example; also Carnal marble.

Sub-Translucent: when merely the edges transmit light faintly. When no light is transmitted, the mineral is described as opaque.
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  
- **Calcite**: 1.654  
- **Spinel**: 1.764  
- **Sapphire**: 1.794  
- **Garnet**: 1.815  
- **Zircon**: 1.961  
- **Blende**: 2.260  
- **Diamond**: 2.420  
- **Chlorite**: 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 calcite. A thin sheet, cut in a particular way, of this mineral from Iceland, called from the locality Iceland-Spar, is used. 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 extraordinary ray, which is the ray 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 diverse nature of the two rays is shown by the way in which the species of the two rays are equal (the dimetric and hexagonal systems) have one axis of double refraction; and those in which they are unequal (the trigonometric, monoclinic, and triclinic systems), have two axes of double refraction.

Red rays in the latter are rays of extraordinary refraction. In nitre the two axes are inclined about 5° to each other; in arragonite 18° 18'; in topaz 65°. The positions of the axes thus vary widely in different minerals.

The extraordinary ray exhibits peculiar properties 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 a single ray, but with the property of vibrating. If the polarised light is made to pass through a crystal possessed of double refraction, and then be 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 rubbed against one another give a feeble light, which may be seen 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 silex-blene is sufficient to elicit light.

Floor-spar is the most convenient mineral for showing Phosphorescence by Heat. On powdering it, and throwing it on a shovelled 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 floor from Herefordshire, Contamahet, shows beautifully the emerald-green phosphorescence.

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 feeble electric shock will in many cases to some degree restore it again.

Many 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 polish. Friction with a piece of cloth is sufficient to excite electricity in some varieties of stone. Some minerals thus electrified retain the power of electric attraction for many hours, as topaz, 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, one extremity will be attracted, the other repelled, thus indicating the polarity alluded to. Several other minerals exhibit electrical phenomena, especially beryllace and topaz, which, like tourmaline, are hemispherical in their modifications.

Magnesium is exhibited more especially in the ores of iron. The leadstone, 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 leadstone will lift a weight of many pounds. This is the only mineral that has decided magnetic attraction; but several ores 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 osmiun, have been observed to be slightly magnetic. Minerals vary in their specific gravity. This must be ascertained as for any other substance. [Specific Gravity.]

The Hardness of minerals differs much, and is the point first attended to in mineralogists. 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 talc, which is very soft and easily cut 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. **Calcite-Spar**, transparent variety.
4. **Flour-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 flour-spar, its hardness 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 6.

The file should be run across the mineral three or four times, and care should be taken to make the trial on angles equally bent, 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.

**Sectile**: when thin pieces may be cut off with a knife, and the mineral pulverises under a hammer.

**Malleable**: when slices may be cut off, and these slices will flatten out under the hammer, as native gold and silver.

**Flexible**: when the mineral will bend, and remain bent after the bending force is removed, as talc.

**Elasitic**: when the bending it will spring back to its original position, as mica.

A liquid is said to be **Viscous** when oil pours 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. For when the elevations are sharp or jagged, as in broken iron. Soluble minerals may have taste : the kinds are— Astringent: the taste of vitriol. Sweetish-astringent: the taste of alum. Bitter: the taste of Epsom salts. Sour: the taste of sulphuric acid. Excepiing a few gases and soluble minerals, minerals in the dry unchanged state do not give off odour. By friction, moistening with the breath, the action of acids, and the blow-pipe, odours are sometimes obtained, which are thus described by,— Allaceous: the odour of garlic. It is the odour of burning arsenic, and 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. Sulphurous: odour of burning sulphur. Friction will elicit odours, and by heating with sulphuric acid. Fetid: 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 limestone and some allied minerals when breathed upon. Others, as pyrrhotite, 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 mineral is stated to be either fusible alone, or with the assistance of the different fluxes, and the nature of the resulting compound is described; sometimes it is a colourless glass, at other times coloured, translucent, &c. (Blow-pipe.)

(Dana, Manual of Mineralogy; Dana, A System of Mineralogy; Ansted, Elementary Course of Geology; Mineralogy, &c.; Phillips, Introduction to Mineralogy; Phillips, Elements of Mineralogy; Jackson, Minerals and their Uses; Sowerby, Popular Mineralogy.)

MINNESOTA, a Territory of the United States of North America, lies between 43° 30' and 49° 22' N. lat., 90° 0' and 109° 30' W. long. It is bounded E. by the State of Wisconsin, N. by the British North America, W. by the Territory of Nebraska, and S. by the State of Iowa. The area is 141,639 square miles. The population in 1856 was estimated at 160,000.

The Territory has generally the character of an immense high "rolling prairie land," but there are considerable exceptions. Towards the eastern side it rises 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 here 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 rises within its boundaries on Lake Itasca, and belongs 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 Mississippi, a large and broad stream, which rises near the centre of the Territory, flows through Big Stone Lake, and after a course of winding its windings of some 500 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 ice. The Missouri, with its tributary, the White River, forms the western boundary of Minnesota; it is navigable by steam-boats throughout Minnesota. It is joined by several small feeders, but none of any consequence in this Territory. The Red River, which flows northward through the region of lakes in Minnesota, and is the source in, and belongs for a very 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, Missouri, and the main streams of the St. Croix and the Red River afford great commercial facilities: while the numerous smaller streams and lakes afford like facilities for agricultural and manufacturing operations. The principal lakes are the Iowa, Lake Pepin, Lake Itasca, Lake Pepin, Lake Utica, and Lake Pepin, which range from about 5 to 20 miles long.

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 south-eastern districts, are tracts of Lower Silurian rocks. Extending from the centre eastward to Lake Superior is a narrow band of New Red Sandstone, with dykes of copper trap. The Missouri and Big Sioux in Minnesota traverses the flow or breccia 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 long but owing to 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 necessarily varied but; in the parts where it is known 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 rice, barley, and buckwheat are also grown. Potatoes, peas, and beans are raised to some extent. The broad prairies appear well adapted for raising stock. There are at present no manufactories 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 take rank as a town; but Pembina on the right bank of the Red River and the seat of the Roman Catholic parish, is important.

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° 23' N. lat., 93° 4' W. long. The first trading house was built here in 1824, it having previously been the station of one of the French voyageurs.

It now contains a state-house 139 feet long, a court-house, jail, nine churches, schools, numerous hotels, stores, an inn, foundry, agricultural implement factories, flour-mills, &c. The streets are traversed by coaches and omnibuses; but, 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 2500.

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 life." 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 the 26th of February, 1857, an 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 constitution of Minnesota was appointed; but the particulars have not yet (April 1, 1858), reached us.

(Statistical Gazetteer of the United States; Seventh Census of the United States; American Almanac, 1854; Own Resolution of a Geological Survey of Wisconsin, Iowa, and Minnesota; Maroon, &c.)
MIRIAMICH. [NEW BRUNSWICK.]

MIRBEL, BRISSEAU- C.F., 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 lecture introductory to the Inductive Method of Planting, in which he expounded the natural history of Buffon. In this work, which 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 Lamartine in the publication of the 'Nouvelles Edis de la Plante,' 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 in the first half of the 19th century. He died September 12, 1854.

MITCHELL, SIR THOMAS LIVINGSTONE, Knor., was born in 1792, at the residence of his father, John Mitchell, Esq., of Craigmillar, in the county of Edinburgh, Scotland. The name of Livingstone was assumed by the family on a marriage with the heiress of J. Livingstone, Esq., of Haining, brother to Lord Viscount Kilsyth, who was attainted 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 back to the Peninsula to make surveys of the great battle-fields. The series of military maps which he constructed from these surveys are preserved in the Ordnance office, and are unsurpassed for accuracy and skilful execution. A map made by him of the battle of Talavera was 18 electoral votes for Lord Lincoln, of whom he is the Museum of the United Service, Whitehall. He married in 1818 the daughter of Lieutenant-General Blunt.

In 1857 Major Mitchell published 'Outlines of a System of Surveying for Geographical and Military Purposes,' 8vo, London. In 1859 he was elected 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 his 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, which was supposed to be 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 country to the north of the Darling, and was conducted as the third expedition, when the Darling was traced to its junction with the river Murray. Australia Felix was also discovered, and the Glenelg was explored to its entrance into the sea. These expeditions were conceived and executed with great and occasional vigilance, combined with the steadiness and resolution of an experienced leader. Major Mitchell published in 1858 his account of these journeys, under the title of 'Three Expeditions into the Interior of Australia.' The work contains 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 Circumferencer, and according to a Triangonometrical Survey, in Three Sheets.' Major Mitchell came to England for the purpose of superintending these publications, and, before his return home 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 Geographical Society of New South Wales.

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 Australia.' At the mouth of the 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 pastureage; but advancing 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-western course, in a direction towards the Gulf of Carpentaria. Mr. Kennedy, however, Sir T. Mitchell's assistant-surveyor, in a subsequent journey 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 deep and swift, and he was compelled to return from want of water and pastureage 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, designed for the use of schools,' 12mo, 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 delivered a lecture on the subject which excited much interest. It was published under the title of 'Origin, 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 6, 1855, at his residence near 12mo, Sydney, and his remains received the honour of a public funeral.

MITCHELTOWN, county of Cork, Ireland, a market and post-town, and the seat of a parish which is pleasantly situated near the river Funcheon on a small tributary, in 65° 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. Mitcheltown Poor-Law Union comprises 9016 acres. Mitcheltown College is a national school, and a town library. There are also a court-house, fever hospital, dispensary, bridewell, and Union workhouse. Mitcheltown College, a group of neat buildings with a chapel attached, was founded by the Earl of Kingstown 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 Mitcheltown, the seat of the representatives of the property, of which the village of Mitcheltown is a part. The river Funcheon rises, and joins 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 22, July 30, September 19, and November 12. Mitcheltown and Kingstown caves are two series of beautiful stalactite caverns, under small limestone hills about 5 miles from Mitcheltown 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 had a large family, consisting of unthrifty and somewhat eccentric habits, and consequently unsuccessful alike in his professional pursuits and in his pecuniary affairs. By his general want of management and inju-
rialis, was her most important subsequent work in a single style. Her later sketches and essays furnished to various 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 Finden'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 and efforts were directed towards the stage. She wrote altogether a large number of dramatic pieces 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 'Foscaris,' a tragedy, was produced in 1825, and another, 'The Gallows,' which had a run, 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 impropriety 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 opera, 'Salat and Kalaarade,' written by her, was produced at the Adelphi. Miss Mitford's last literary appearances was in an edition of her 'Dramatic Works' (3 vols., 1854), which, besides the pieces above named, included a tragedy—printed for the first time—'otto of the Forest,' and 'A Visit to the New World,' which was reprinted for performance, and twice withdrawn; a melodrama, 'Gaston de Blondeville;' and several 'Dramatic Scenes.'

In looking at Miss Mitford's works, it should be borne in mind that, though they seem almost invariably the relics of a mind full of happy images, and surrounded by pleasant circumstances, they were often really written under the pressure of pecuniary discomfort and during much ill-health. As long as her father lived her attention to him was entire, and from his death she devoted herself with all the firmness and energy which her fame is chiefly founded—'Our Village'—for a new edition, which appeared in 1853, she compiled a sort of literary patchwork, 'Recollections of My Literary Life; Books, Places, and People,' which is in fact a sort of compiling. But it is not the interest of such a work that 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 'Scots Magazine,' and published an 'Unpublished Poems,' which were printed various editorial biographies; and in 1854 she published 'Atheron; a novel,' in 3 vols. She died at her residence, Swallowfield Cottage, near Reading, on the 10th of January 1855.

MOA. [Dinwiddie, S. 2.]

MOCHA-STONE. [Asatr]

MOIR, DAVID MACBETH, was born at Musselburgh, in the county of Edinburgh, on the 5th of January 1798. He was educated at the grammar-school there, and was apprenticed to a local printer and stationer.

...
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 but laborious practice. 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 frequently determined author, and his name appeared in '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. Valentine's Day,' and 'The Antique Ring.' Some of them were supposed to be from the pen of Dr. Maginn. His serious poems were marked as by a, a signature which he retained in that magazine until his death. In 1823 he formed a strong friendship with John Galt, who, when he departed for America, left his novel, 'The Last of the Lairds,' unfinished, and Moir wrote the concluding chapters for him. In 1824 he published 'The Legend of Generoive, with other Tales and Poems,' consisting of selections from his magazine contributions, with some original additions. In the same year he commenced, in 'Blackwood's Magazine,' his novel of 'The Autobiography of Manse Vatch,' which was continued for nearly three years, and was afterwards published separately. It was greatly successful, and the character of its author was emboldened by some of the peculiarities of Scottish character. During all these literary labours he continued to attend to his professional duties with indefatigable assiduity and extreme kindness. In 1830 he married, and it is said he have slept a night out of Musselburgh. He was now recommended to remove to Edinburgh, where he might have readily attained a more lucrative practice, but his attachment to his old haunts and his old patients and neighbours caused him to refuse the offer of marriage. In 1831 he published his 'Outlines of the Ancient History of Medicine, being a View of the Healing Art among the Egyptians, Greeks, Romans, and Arabsians.' In 1832, after having exercised himself in the practice of his profession for twenty years, and while cholera was raging in his district, he published a pamphlet, 'Practical Observations on Malignant Cholera,' which had a very extensive circulation; and this was followed by 'Proofs of the Contagion of Malignant Cholera,' both works being allowed to possess great merit, even by those who differed from the author's conclusions. In 1832 Mr. Moir attended the meeting of the British Association for the Advancement of Science at Oxford, and afterwards visited London, where he extended his acquaintance amongst the literary worthies of the city. In 1833 he published 'Imagery Verses,' in which, among other things, he records, with much tenderness, the loss of two of his sons, who died young. In 1845 he contributed the account of the civil history and antiquities of the county of Edinburgh, which made him the chief town to the 'New Statistical Account of Scotland.' In 1846 he met with an accident, being thrown from a carriage, by which he was rendered lame for life. In the spring of 1851 he delivered a series of lectures on 'The Poetical Literature of the Past Century,' at the Edinburgh Philosophical Institution. In the same year, 'Selim,' his last contribution to 'Blackwood's Magazine,' appeared, and on the 6th of July he died. His activity had continued unabated during his whole life. He had, besides paying a sedentary attention to his profession, filled various municipal offices, and had been a member of the General Assembly. His contributions to 'Blackwood' alone number 370. His serious poetry, by which he will be chiefly remembered, is sweetly pensive and tender, without any markable original poetic power, but it possesses a charm in its natural imagery and its appeals to our feelings that can never fail to please. In 1862 his 'Poetical Works,' which, however, are only a selection, were published, with a memoir by W. M. Brand. 

MOLÉ, COMTE DE, was born in 1781, and was descended from an illustrious family in France. He was the son of the President M. lè, who fell a victim to the violence of the first French Revolution. He was however rescued from the wreck of his family fortunes to enable the father to send his son to the Central School of Public Works, afterwards called the Polytechnical, where he pursued his studies with industry and vigour. In 1800 he published 'Essais de Morale et de Politique,' 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 received with a highly absolutist cast, and though the auditor continued to the last a staunch adherent of the Bourbon dynasty, he remained in office under the Bourbons after their restoration, who created him a peer of France. To the policy and measures of Prince Polignac he offered the most decided opposition. After the fall of the latter he was appointed by Louis Philippe to the portfolio of Foreign Affairs, and shortly afterwards was advanced to the post of Prime Minister of France, which he eventually resigned by the opposition of M. Guizot and M. Thiers. Under the Ministry of Thiers he was appointed to the Legislative Assembly, he took little or no part in its proceedings. The family of Count Molé was of that rank which is known as the" nobility of the robe," and his ancestors were of such blood as long ago as the days of Henri 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. Count Molé was almost the last remaining link between his countrymen of the old and of the new régime, as 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. While M. le Prince Molé accepted each successive change in the governing system of France, he recorded himself as one who could not say that he ever swerved from principle in the opinions which he had originally professed. At the close of his long career, under various successive changes of government, he retained the same attitude, and departed life as he entered upon it, a supporter of the old monarchy. 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 Catholic supporters of the Roman Church. 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 the death of the author, who died 4th November, 1861, at his family seat at Chapmatreux, November 23rd 1855. MOLESWORTH, RIGHT HON. SIR WILLIAM, eighth Baronet of that name, was born in 1810. He was the lineal representative of an old Cornish family of large landed possessions, originally of Irish extraction. The first baronet 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 he was spending some time at Cambridge, he was appointed in 1837 by the Government to Edinburgh as Professor of Political Economy, metaphysics, and metaphysical science, 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 will with the French a talent in the study of languages. Having left England with an average acquaintance of general and classical knowledge, he concentrated his powers in Germany upon the study of philosophy 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 parliamentary reform, and his speech on that 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 1835, but withdrew from the contest in July 1837, when he was returned for Leeds. At the dissolution of 1841, being convinced that his chance of success at Leeds was hopeless, he declined the contest, and remained out of parliament for four years. During this time, which he spent in Germany and Italy, he engaged himself 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 candidate for the representation of the borough of Huntingdon, and though strenuously assailed for his support of the grant to Maynooth College, he was successful, and he continued to represent the same constituency to his death. In January 1859 he accepted the office of First Commissioner of Public Works on the formation of Lord Aberdeen's administration,
and was re-elected without opposition; and again on his subsequent translation to the Colonial Office.

As a 'Commons' debater' Sir William Molesworth was not of the oratorical school of speakers in parlour life; but was always valuable, though of too philosophic a cast to be 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 in his time. The same passion and spirit 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 Molesworth found a sphere far more congenial to his tastes, and here his admirers would hold him in esteem, on being appointed to the secretarship 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 1 April 1856. The colonial and domestic press were 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 country 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 transportation of criminals, though eighteen years had elapsed since the passing of the hurriedly constructed and not entirely well-conceived anti-abolitionist act of 1833. It brought to light all the horrors of our penal system. In the words of a writer in the 'Times,' 'Sir William Molesworth found our colonial empire disorganised and disordered, and the Colonial Office was meddled with 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 our self-government and independence. With unexampled vigour and great constructive power he prepared draught constitutions, and investigated the relations between the imperial government and its dependencies. Starting from a small mismanaged and public opinion over to the other 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 the prime of life, he was at the height of his powers, and the noblest prize of ambition, in the enjoyment 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 died when he was strong, and when he knew himself. He left his name with the destinies of every British community planted 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 epitaph 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 Molesworth was favourably known in learned and scientific circles. As '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 infrequent 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.] He was a good mathematician and a well-known botanist; but his acquirements extended over a large range of subjects. In private life few men have been more highly esteemed.

MOLLUSCA. — According to the articles Conchifera, Gasteropoda, Cephalopoda, and Malacology, for information as 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 Molluscan forms; secondly, in what way the Common Plan is more specially modified in the leading sub-generic groups of this great division of the animal kingdom; thirdly, the various modes in which the organs are arranged being thus comprehended—what peculiar characters are presented by these organs themselves; and fourthly, the development of the Mollusca, so far as it bears upon the idea of a Common Plan. 

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 any group, in such a relation as to render it possible to forecast alike excessive development. It is, in fact, simply a contrivance for rendering more distinctly comprehensible the most general propositions which can be enunciated with regard to the group, and has the same relation to such propositions as the diagrams of a work on mechanics have to actual machinery, 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 us. Other authors have been likely to use it. We prefer the phrase 'Common Plan' as less likely to mislead.

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 the characteristic feature which would be brought out by being compared 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 1859) would require more space than we can here devote 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 whose operation these modifications are brought about.

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 are to be distinguished in it:—

(1) The head.

The head is suspended, 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 is therefore best avoided in the present case. For the same reason, the opposite region (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 or oral end of the animal. Opposite to this (a) the body is divided into two parts (b, c). These two parts are the foot (b) and the head or Prosoma (c). The foot bears the organs of locomotion, and a large part of the body may be thrown into a muscular enlargement on each side, just below the junction of the head with the neural region—the Epipodium (ep). The mass of the body between the foot proper and the abdomen, or part it may called the Prosoma, and whose limits cannot be very well 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 Prosoma might be better reserved. However the part of the head or Prosoma are two pairs of organs of sense: the Eyes (which may be supported on pedicles—Ommatophores, and the Tentacles. In the head region the integument may be peculiarly modified and may form a pellucide layer, which may be called the anus, and when so modified it is called a Mantle (Pallium). In front of the anus again the Branchiae (t) project, as processes of the head region. Among the internal organs we need only point out the position of the Heart (s, 9), which lies in front of the branchiae in the head region; and the
Nervous Ganglia (α, γ, z), of which there are three principal pairs arranged around the alimentary canal, which they encircle by means of their commissures.

Fig. 1.

I. The Ideal Archetype or Common Plan of the Mollusca.
II. Its modifications in consequence of the development of an abdomen and consequent neural axes of the intestines. 1, Hypostomus; 2, Peripoda; 3, Cephalopoda.
III. Modifications resulting from the development of a post-abdomen and consequent hemal axes. 1, Hypostomus; 2, Pedasterbranchia Gasteropoda. IV. Primarily neural axis modified by subsequent changes. 1, Lambellicrania Mollusca; Neural Mollusca. 2, Brachiopoda. 3, Polyzoa.
V. Hemal Mollusca (Anodiscidae). 1, simple hemal axis, as in Appendicularia; 2, after hemal axis the intestines is bent back, and an atrium is formed; the branchial sac remains comparatively small; 3, the branchial sac comparatively large.

The letter have the same signification as in these and all the other figures, with the exception of figure 10.

Such is the Common Plan of which all Mollusca 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 Mollusca may be very simply accounted for by the successive or defective relative development of certain regions in the archetype, more particularly of one or other parts of the Hemal Region. Of this region the portion which lies in front of the anus may be conveniently termed the Abdomen, while to 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 (α), 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 be in the opposite direction, and the intestine will be flanged on the surface; the intestine therefore may in this case be said to have a Hemal flexure (iii.). 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 has nothing to do with the 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 Mollusca. 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 median line being dependent 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 thrown round on to the hemal 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 hemal flexure again, the direction of the anus will be normal; in which case, the anus is the hemal side, and backwards; 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 value as organic characters. M. Milne-Edwards long ago pointed out the singular fact that, in certain Mollusca, the branchiae are in front of the heart, while in others they are behind it. The latter he termed Opisthobranchia, the former, Prostombranlia. It will be seen that our Archetype is Opisthobranchia. Now, it is easy to understand that if an Abdomen were developed in front of the heart, without involving the cardiac region, the Mollusca would remain opisthobranchia; if however it were more extensively developed, so as to involve the heart and branchiae, the heart from having been in front, would eventually take a position posterior to the branchiae, and the Mollusca would thus become prosobranchia. So, with regard to the development of a Post-abdomen, its effect on the position of the heart and branchiae, and on the development of the neural and hemal surface which it involved. It follows, therefore, that Opisthobranchia may co-exist with either a hemal or a neural flexure, or with none; while Prostombranlia indicates one or the other, but not which; and that these organic characters, however valuable, are secondary to and therefore of less importance than the neural and hemal 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 Hemal Plans. The Cephalopoda, Pulmonata, Peripoda, Lamellibranchia, Brachiopoda, and Polyzoa, are the molluscs which present modifications of the Neural Plan; the Heteropoda, Gasteropoda, Tectibranchia, Iniferoibranchia, Cycloibranchia, Tubulibranchia, Nudibranchia, and Astidinea, are those which present modifications of the Hemal Plan.

3. The Neural Plan and its Principal Modifications. — Milne-Edwards has proposed a division of the Mollusca into the Mollusca proper, and the Molluscoidea (Molluscoidea), including under the latter class those Polyzoa-like molluscs, the Anodiscidae. Believing these Molluscoidea are as truly and wholly Mollusca as any other 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 Hemal and Neural Divisions. In the hemal division the limits of the Molluscoidea are the same as for M,
Milne-Edwards; but in the neural we include somewhat more. In fact, if the most fitting definition for this subdivision be those Moluscs which have the neural region comparatively little developed, and the nervous system reduced to a single or at the most a pair of ganglia, while the mouth is usually surrounded by a more or less modified cirrlet of tentacles, then we shall find that, in the neural division we must include the Brachiopoda with the Polyzoa.

Commencing our study of the morphology of the special groups of the Moluscs with the Neural Division; and with the Moluscoid sub-division of the neural forms, we have to consider first, the Polyzoa and the Brachiopoda:

**Fig. 2.**

The Polyzoa.—Conceive the abdomen of the Archetype to be greatly prolonged, the neural region with its appendages, the organs of sense and the heart remaining undeveloped so that the anus comes into close opposition with the oral extremity, while the edges of the latter are produced into long ciliated tentacles, and the result will be a Polyzon, which needs only the power of gummation 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, Clenostomata, Chelostomata, Hippocrepia, and Pedicellata.

In the first three, the body of the Polyzon 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 joins the soft parts by an even level edge, and there is nothing which serves as a cover or operculum for the retracted Polyzon.

In the Clenostomata (fig. 2, 3) the margins of that portion of the abdomen which is inverted in the retracted state are produced into a toothed horn, shelly, which can be retracted by special muscles, and which serves as an operculum.

In the Chelostomata (fig. 2, 1) the horny or calcareous deposit takes place in such a manner that the hardened integumentary portion of the axial region constitutes a sort of lid, regularly articulated upon the hinder portion, and provided with proper occlusor (or perhaps levator') muscles. It should be noted that the anal aperture is directly 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 Hippocrepia (fig. 2, 5), which are all fresh-water forms, the lophophore is so produced into the 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 Polyzon, 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 Chelostomata are remarkable for possessing two kinds of moveable appendages—Tolellaria, whip-like processes, articulated to a bulb containing muscles by which they are moved, and Ariculata or short processes of the head (fig. 2, o). 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 articulata 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 tendon (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.

**Fig. 3.**

The Brachiopoda.—Now, if we compare the relative positions and mode of articulation of the operculum and cell of a Chelostomatous Polyzon, or of the two valves of an avicularium, with those which obtain in the shells of the typical Brachiopoda, such as the Terebratulidae and Brynhellidae, the resemblance will be found to be very strong; 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 Polyzon 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 Brachiopod are essentially comparable to those of the lophophore of a Hippocrepian Polyzon, 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 exu-tence can in nowise 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 retractor of the Polyzon), 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 its 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 Pinctada.

Finally, if the great proportional size of the Brachiopoda, their pedunculated attachment, their thick and solid shells, and their simple forms, be brought forward as arguments against the view we take of their essentially polyzoic nature, we would remind the objector of the like opposition in such features between Bolechia and Botryllus, or Apisidum, among the Ascidians.

Two principal modifications of the common Brachiopod plan are to be observed. In the Teredolitidae and Rhynchosomellidae, and in all probability in their extinct allies the Spiriferidae, Orthidae, 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 Polyzoa 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 Waldheimia and Rhynchosoma, there is no anal aperture, the intestine terminating in a coxum, directed towards the middle of the large valve.

In the Cramiidae, Diciniidae, and Lingulidae the muscles have a very different arrangement, which could only be rendered intelligible by detailed descriptions 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 (Dicinia, Lingula, Crania?), 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; Crania being attached by the surface of its lower valve; and Dicinia 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 plug, 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 Molluscoidea, 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 mesial region is well developed in its abdominal portion, but forms no prominent sac-like vessels, into which the viscera enter in the adult condition. Its edges are produced into extensive pallial lobes, which are arranged on each side of a longitudinal plane, and not above and below a horizontal plane (or more properly behind a transverse one), as in the Brachiopoda. The mouth is surrounded by a fringe, representing the tentacles in the Molluscocida (as may be well seen in Pecten, fig. 4, 4) which is produced laterally into elongated 'palps,' but is totally unprovided with any mandibular apparatus. The intestine passing from the stomach either forms a simple loop with a second open angle directed hemisally, 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 prosoco- and metapo-lum, unless indeed, as we are inclined to suspect, the whole free portion of the foot of the Lamellibranchiata ought to be regarded as 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 deviate but little from their archetypal form and position in some Lamellibranchs, such as Trigonia and Pecten, being merely thrown downwards by the development of the mantle. In Nucula (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 branchial 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-
The 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 presenting the general features 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 in which these Mollusca constitutes the so-called 'wings,' from which their name is derived.

There is usually a well-developed mantle in the Pteropoda and Pulmonata, and its walls act as a branchial surface without being produced into true gills—(Hyales?; 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 texture of the intestine. The anal aperture however is usually thrust to one side of this surface, and, in Limacina and Spirula, 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 latero-dorsal, or dorso-plantar aperture, is 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 mesosoma on the one hand, and of the mantle on the other. The predominance of the latter is to be observed in such forms as Cretia, Creedora, Hyales, and Hetia; while the former may be seen in Pneumoderma and in Limas. 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 mesosoma. The like condition together of parts so essentially different has taken place, we shall find, in the Nudibranchiata and in the Heteropoda.

The Cephalopoda.—In the Pteropod forms, Pneumoderma and Cletus, a hood, giving off long processes covered with suckers from its inner surface, surrounds the oral aperture, and there is every reason to believe corresponds with the propodium, whose lateral halves have united over the mouth. If the like process were to take place in a Cretia, but to a greater extent, so that the mouth were thrust back between the halves of the mesopodium, and the propodium and mesopodium formed one continuous tentacular orifice around the oral aperture; and if at the same time the two halves of the epipodium united posteriorly into a funnel-shaped tube, the Cretia, so far as its external organization goes, would no longer be a Pteropod, but would have become a Cephalopod. In fact, the Cephalopod may be derived from the Archelopseus by supposing these modifications. The mantle is always well developed, and its cavity incloses one or two pair of gills. The two halves of the epipodium are united behind into what is called the funnel, a peculiar apparatus, of great importance in the economy of many Cephalopods; and in the majority of the group the sides of the foot, having united in front of, and forming a complete sheath for, the head, are produced into eight or ten processes, the so-called arms, on which are set the acetabula, or suckers.

Fig. 5.
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 Mollusca.

Having thus glanced at all the leading modifications of the Neural Plan, we may next turn to the Hemal Plan, commencing with its Molluscoïd modification constituted by the Ascicidaea alone.

The Ascicidaea.—As a Molluscoïd group, the Ascicidae are characterized, in the first place, by the rudimentary condition of their whole neural region, and by the reduction of their nervous system to a single intra-oesophageal 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. An Ascidian, in fact, is usually fixed by one extremity of its 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 hsemal flexure, and then almost always bends backwards neurally to terminate in a second wide cavity. This, the atrium, whose more external portion is usually termed the cloaca, opens externally by the second or cloacal aperture, and extends along each side of the branchial sac up to its median line of attachment—communicating freely with its cavity by means of the small ciliated apertures which have been mentioned. The single ganglion lies between the oral and cloacal apertures.

Fig. 7.

Ascicidaea.—1. Botulina. 2. Ophiola. 3. Bythula. 4. Intestina of Periphorea. 5. Cloeon. 6. Stylo. 7. Appendicularia. a. oral aperture; b. anal aperture; c. or extremity of the intestine; d. cloacal aperture and atrium; e. branchial sac; f. hypo-pharyngeal band; g. tent. g. gastropod; h. pedal ganglia.

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 Polyzoa, becomes comparatively enormous in the Ascicidae; while the tentacles, which were very large in the Polyzoa, are in the Ascicidae comparatively small. Next, with the development of a post-abdomen, the intestine acquires a hsemal flexure; but instead of the anal aperture remaining on the hsemal side, it is bent round, by the same process as in Spirifera and Limacina, but in the inverse direction, so that the cloaca is not at all 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 of the surface of the latter, carrying to a great extent a process of which the outline may be seen in Cymbula, and giving rise to the atrium;—imagine also that the sac thus constituted externally by the inner surface of the mantle (third tunic), and internally by the pharynx, both separated 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 subordinate modifications. The first is that presented by the extreme species of the type (fig. 7, 7), in which 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 Ascicidae; from this a gutlet leads into the stomach. The narrower intestine passes from the stomach, forwards and to the hsemal surface, where it turns back horizontally, the mouth being surrounded by any special cavity. Appendicularia therefore might be said to be a form in which the process of modification of the Molluscan Archetype into the Ascidian Type is arrested half way; such a gutlet is the Cynthis, Botula, 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 Ascicidae Botulinae. Brachiata Ascicidae, the other hand, in Clionea, Apiditea, Polycentrum, Salpa, the alimentary canal lies completely behind the branchial sac, which is proportionally small, and these might therefore be termed Ascicidae Intestinae. Intestinal Ascicidae. A very complete mutual representation will be found to obtain between the members of these two groups.

Hemal Mollusca.—In passing from the Hemal Molluscoidea to the Hemal Mollusca, 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 Mollusca, in fact, there is a more or less well developed foot; a distinct head, with the organs of sense and buccal armature; and three pairs of ganglia—cerebral, pedal, and parieto-mesophract.

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; on 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 Mollusca into two great groups—the one consisting of the Heterogena, Scutibranchiata, Tubulibranchiata, Pectinibranchiata, and Cyclostomata, families, which are most intimately allied, and which are connected and derived by the diverse arrangement of the reproductive organs; and the other of the Nudibranchiata, Inverceibranchiata, and Teuthibranchiata, families in like manner united, among other characters, by their common hermaphroditism, then we shall form in each group two extremes of form—the one resulting from the great development of the pallial region, the other from that of the mesosoma. In the Diccous Division, Denudalium, Veneridae, and the ordinary Pectinibranchiata may be regarded as examples of the former case; in the other case, in the Mollusca the Division the Inverceibranchiata and Tectibranchiata; while the mantle becomes rudimentary or absent altogether in the Diccous Foliolidae, in the Monocous Physalidz, and the Nudibranchiata in general, where the region from which the so-called branchial processes are derived, and which is commonly called the mantle, is not the homologue of the mantle of Atlanta for example, but of its mesosoma, which
here, as in *Firoloides*, constitutes the main portion of the
body.

**Fig. 8.**

Heteropoda.—8, *Atlantic*; 9, *Firoloides*.

*Fig. 9.***

The foot in the Monoceros Hemal *Mollusca* rarely presents any special development of its different regions, except that in certain forms—namely, *Alpavica* and *Gasteropteron*—the epipodium is as well marked as in the *Pteropoda*, and serves the same end in locomotion. This is well known in *Gasteropteron*, and we have seen a tropical *Alpavica* 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 Diceros 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-laplets and head-laplets of the *Trocchae* 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 *Atlantic*, 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 stout swimming fin.

In the ordinary *Pectinibranchiate*, 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 *Buccinum*. In other cases, as in *Oliva* and *Sigaretus*, a deep cleft marks off a very distinct propodium from the conjointed mesopodium and metapodium; in others, as in *Pierceres*, the metapodium is so specialised as in *Atlantic*; while again, in still others, as in *Navicula*, 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—2 and 3.)

Having thus passed in review those models 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 organs themselves, or, in other words, those more striking features in which the organs of the *Mollusca* differ from those of the *Vertebrata*, *Anamnia*, and *Radiata*. The most important organs, in this point of view, are those of—1, 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 manducatory instrument usually called the 'tongue', which is possessed by all the *Mollusca* proper, except the *Lamellibranchiata*; and for the first description of those true structure and mode of action we are, we believe, indebted to Mr. Thompson (see article 'Tongue,' in the *Cyclopedia of Anatomy and Physiology*), although the organ itself had been worse or less an object of attention ever since the time of Cuvier.

**Fig. 10.**

Tongue of *Radiola*.

1. a, the cartilaginous plates which constitute the pulley over which the elastic plate 2, supporting the series of teeth 3, plays; 4, a view of the anterior and posterior portions of the muscular muscles of the tongue. 1 is an internal view, and 3 is a view from above, of the entire apparatus.

The tongue is essentially composed of a cartilaginous mass, with a pulley-shaped upper and anterior surface, which projects from the bottom of the oral cavity. An elastic plate plays over the pulley, 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 recurved 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 superior 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 *Radiola* bores through the shells of the animals upon which they prey, and perforates shells, which have been thus emptied, abound on every coast.

The other appendage of the alimentary canal peculiar, as far as we at present know, to the *Mollusca*, is what is termed the *Crystalline 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

* Our limits preclude the consideration of the tegumentary and genital systems, whose peculiarities, however, are less exclusively *Molluscan*. 
that organ. The Crystalline Style is found in a great number of Lamellibranchs (to which it has erroneously been supposed to be confined), but has hitherto been observed in only a few Pectinibranch Mollusca, such as Pterocera, Striasoma, Tropaea, and Murex. Its function is wholly unknown. As the alimentary appendages, the Liver in one group, the Ascidians, depart 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 tubules, commencing in ceca upon the outer surface of the intestines, unites in a main trunk, and terminates by a narrow duct, in the stomach. In the Botryllida the hepatic tubules are remarkably wide.

2. The nature of the Circulatory System in the Mollusca is so peculiar and exportunate extensively as regards the important point whether they possess a true closed 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 Polyzoa there are no special circulating organs, if we except the cilia with which the pericircular cavity is often lined, and which keep up a continual current in the pericircular fluid; nor do we imagine that any one will insist that the pericircular cavity is not a sinus, 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 drawing blood from the body by means of cilia, thus circulating its blood first in one way and then in the opposite. The blood thus poured out is driven by any open channel in which assuredly no separate lining membrane is demonstrable. Indeed it is difficult to comprehend how any animal with a living tube and his microscopic reaction that here, at any rate, the circulation takes place through lacunae, and not through vessels with distinct walls.

In the Brachiopoda a very remarkable vascular system has been discovered, and this one of two hearts (in Rhynchonella of four), each composed of an auricle and a ventricle; the former being in free communication with the pericircular venous sinuses (pericircular cavity, notis), while the latter ends in a sorta, 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 cir- cumulatory system. It fact these inquiries lead us to doubt whether any of these so-called ‘hearts’ of the Brachiopoda have anything at all to do with the circulating system; inasmuch as, in the first place, we are pretty confident that no ‘arteries’ are given off from the spines of the ‘ventricles,’ as has been said, and think that most of the processes arise independently. Secondly, there is no evidence at present, 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 their 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 advanced by M. Milne-Edwards that in these Mollusces the circulating system is always more or less incomplete, has met with a wide acceptance, but also with no small opposition. So far as the molluscan system becomes developed in the higher forms, microscopic observation during life, are concerned, we 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, assuredly it cannot be said with truth that the kind exists in the sinuses of Fritolida, or of Atlantic, or in those of the Pteropoda.

In the larger Mollusca, on the other hand, much depends on the verbal question—‘is the so-called ‘vein’ or ‘sinus’, or “the liver’—as it were there where there is a less or more complete vein system, there must be a greater histological differentiation corresponding to that which exists in the Vertebrata be re-quired to constitute a vein, evidence of the existence of any-thing of the kind in the greater proportion of the venous blood-channels of these forms are at present wanting.

As regards the grosser structure of the circulatory system in the Mollusca proper, it may be observed that, in the Lamellibranchs there is either a single auricle and a single ventricle (Ostrea), a single ventricle and a double auricle (most Lamellibranchs), or two auricles and one ventricle (Arca). In all other Mollusca, except the Cephalopoda, there is a single auricle and a single ventricle. In the Cephalopoda the heart is essentially similar to that of the Lamellibranchs, insomuch as it consists (in the Diobranchiata) of a single auricle and a single ventricle, being represented only by the regular contraction of the so-called ‘branchial hearts,’ which are dilatations of the afferent branchial veins, but by that of the gills themselves.

The nature of the so-called Pericardium in the Mollusca has been much misunderstood. It is most important to re-collect that in no case is there evidence of its being a closed serous sac, comparable to the pericardium of the higher animals. On the contrary, wherever it has been examined with sufficient care (Lamellibranchiata, Cephalopoda, Perip- poda, Nudibranchiata, and Cephalopoda), it has been found to be a blood-sinus, which in some cases (Pteropoda, Cephalopoda (1), Lamellibranchiata (1), and Heteropoda) communicates with the exterior by the mediation of the renal organs.

3. The Respiratory Function is performed by modifications of several distinct parts in the Mollusca. 1. By the general surface of the pallial cavity, which may be more or less adaptively modified; this kind of respiratory organ is to be found in the Brachiopoda, Peripatoda, and Cephalopoda.

2. By specially modified parts of the walls of the palpial cavity into true gills; the whole tendency of the modification of form which these gills undergo is to increase their surface, their thickness, their reticulation, is effected in one of three ways:—a. By the development of simple processes, as in Patella or Atlantic. b. The simple processes become rami-fied, so that the gill eventually consists of a stem with lateral branches, and these again may be subdivided into smaller and smaller branches—Pteropoda, Peripatoda, and Cephalopoda. c. In the Lamellibranchiata each gill essentially consists of a stem with lateral undivided branches, and in such forms as Trigonia and Nucula (fig. 4, No. 3, &c); the branches have precisely this structure. In Nucula the lateral branches are but minute tubules, and in Trigonia they are much longer. In Pecten they turn up at their free ends upon themselves and form a close loop, so that the free end takes a position near the fixed extremity; at the same time lateral branches are produced in the posterior quarter of the gill, and they connect them together by a very loose and open vascular network. Each gill has thus become a flattened pouch, completely open, both laterally and superiorly; the sides of the pouches are very open, and are constituted superficially by the parallel produced and reflected portions of the lateral branches, and more deeply by the very loose network formed by the anastomosing lateral processes. Now, if we suppose that the reflected portion of the outer gill-pouch adheres to the mantle, while the reflected portion of the inner gill-pouch remains free on each side of the foot, but adheres to its fellow behind the foot, thus forming a complete partition across the pallial cavity, the deep vascular network becoming very close, and giving off vertical septa, by which the pouches are subdivided into processes, so that the whole then the result will be such a gill as we meet with in the Oyster, the Unio, and the great majority of Lamelli-branchiata. The minute structure of these branchiæ strikingly resembles that of the branchiæ of the gastropod molluscs, and as has been long since pointed out by Siebold and others, and has given rise to the prevalent idea that the two organs are homologous. Structural resemblance, however, is in itself no true basis for the establishment of homologies, and we are of opinion that the means of breathing are much less likely to be simply analogical. 3. The ‘branchiæ’ of the Nudibranchiata again doubtless subsist to breathe, yet they are developed from the mesosoma, and contain the gastro-hepatic processes of the alimentary canal, and thus do not correspond to true gills. 4. The branchial sac of the Ascidians is, as we have shown, a modification of their pharyngeal sac, resembling
the gills of fishes (especially Amphilius) more than any other structure to be found in other Invertebrata (the nearest approximation perhaps is in the cloacal branchiae of Neopterous Larvae and of some Annelids). Like the wall of the gill chamber of the branchial sac of the Ascidians, in the Ascidian 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 structure of the branchial sac of the molluscan kidney produced by the plaiting of its wall into the so-called branchial folds, which may vary in number from four (Cyathus) to a number so great that the wall of the sac appears cramped (Gastropoda).

4. The Renal Organs.—The existence of a special organ for the urinary reception 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 excretion beneath 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 many concretions, are scattered over the intestine immediately beneath the lining 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 forms the whole partial surface of the atrium. Here the secreting part of the apparatus appears to be out of proportion to the excretory. In the Peripatoda 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 efficiently washed. How far the internal communication with the blood-sinusises is available for the same end, is not at present understood. In the Lamellibranchiata (at least in Unio) the pericardial sinus is connected anteriorly with the internal cavities of two spongy bodies—the glands of Bojanus—in which a great quantity of concretory material 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 contractile sac of the Peripatoda and Heteropoda, but no evidence of contractility has yet been observed in it, or in the renal organ itself. Keber also denies that any direct communication exists between the walls of the kidney and the pericardial sinus and the outer sac, but it is somewhat difficult to make 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' of the kidney are attached to the base of the gills and connect the peculiar 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.

5. The Nervous System. In the Mollusca the Nervous System consists of the Polyzoa and the Mollusca and the Mollusca respectively present a remarkable agreement in the general arrangement of their nervous apparatus, which consists in the Polyzoa and Archiokiida of a single ganglion placed in the midst of the neural region of the body; in the former case between the oral and anal apertures, in the latter between the oral and cloacal apertures. In the Brachiopoda the nature of the nervous system is only known with certainty in the Terebratulida, where it consists of a single elongated lophophore, running from the tip of the lophophore close to the ganglion, probably representing the 'nervus' of the Ascidians, an organ whose function is not known, but which probably performs, in conjunction with the ciliated sac, the part of an organ of sense. The 'ciliated sac' is, as its name implies, essentially a small ciliated pouch placed between the oral end of the hypopharyngeal band and the

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memory; but the amount of the value of such conceptions, and of their beneficial influence on the forward progress of science, depends entirely on the extent to which they embrace the whole anatomical peculiarities of a group of animals. Now animals, like all living beings, not only are, but become; and their anatomy, in the widest sense of the term, is to be obtained, not merely by the study of their structure (which is their final anatomy), but also by that of their development, which is the anatomy of the successive states through which they pass in attaining their final condition. Now the Archetype or Common Plan professing to be the embodiment of the most general propositions which can be enunciated with regard to the anatomy of the group, its validity will depend upon its embracing both structural and developmental facts. If it neglect either of these, it will be theoretically imperfect, and will run the risk, at any rate, of being practically erroneous. Before the publication of Von Baer's 'Archetype of the Vertebrata,' unfortunately too little data was known as to the extent notions of archetypes, unity of organization, &c., were open to precisely this objection, their authors having contented themselves with devising hypotheses to fit the facts of adult structure, without concerning themselves whether their hypotheses would or would not also fit the facts of development. Hence the infinite variety of baseless speculations of the 'Nature-philosophie' school; in botany, the unlimited and quite gratuitous demands upon 'abortion and fusion' of parts which Stieda has so justly ridiculed; in zoology such notions as that a Cephalopod is a vertebrate animal doubled upon itself, that an Insect is a vertebrate animal with free ribs, &c.

It is precisely on this footing however that at present our Common Plan or Archetype of the Mollusca stands. We have before us the evidence which might perhaps have satisfied Geoffroy and Oken. Given our plan and certain laws of modification, and all known molluscan forms may be derived from it; but it remains to be seen how far the evidence which would alone have satisfied Von Baer, the evidence of development, justifies the view which has been taken; how far, in fact, our hypothesis is capable of being elevated to the dignity of a theory.

To this end it is by no means requisite to show that every Mollusc has at one time the archetypal form, and is subsequently modified into its persistent condition; to maintain such a proposition it would be necessary greatly to simplify (though not essentially to alter) the archetype, and thus to do away with a great part of its utility in exhibiting the tendencies of every Mollusc. All that appears to be really necessary is to show:—first, that no molluscan form presents features in its development which cannot be reconciled with the archetype; secondly, that the kind of modifications which have been supposed to take place in the conversion of the archetype into the special types are as actually occur.

The first stage of development of the Mollusca resembles that of other animals. The yolk, at first a homogeneous mass, undergoes the process of division to a greater or less extent, its outermost layers eventually becoming converted into a blastodermic layer, the plastic material out of which the future animal is modelled.

In the Mollusca the rounded or oval embryo thus formed either becomes covered with cilia and swims away as a free form (Polyzoa Brachioidea), or it gives rise from one portion of its surface to a long fin-like muscular process (fig. 13, 1.), by whose rapid vibration it is propelled (Ascidioidea, in great part). With what organ of the Mollusca is this 'tail' or 'fin' of the Ascidian larva homologous? This is a very difficult point to ascertain, as the tail arises before the regions of the animal are differentiated. At first sight one might be tempted to consider it as a modification of the velum of the embryos of the Mollusca proper; but its relation to the middle of the neural surface, and its insertion close behind the ganglion, which may be readily observed in later stages, appear rather to indicate that it is the homologue of the foot proper, and probably of the metabolism, as this is the portion of the foot in which the Mollusca appears first.

In the further development of the Ascidioidea there can be no question as regards the Polyzoa, the neural region soon almost ceases to grow, the further increase of the body taking place by the disproportionate development of the haemal region, which constitutes almost the whole of the body of the adult animal, and presents the surface by which it becomes fixed. Again, simple inspection is sufficient to show that the intestine extends into the great abdomen thus developed; that it acquires herewith a neural fixture; that the tentacles are produced from the margins of its oral aperture; and that the pharynx acquires a large proportionate size.

In the Ascidioida the neural region remains in a like rudimentary condition, the haemal region undergoing a similar disproportionate growth; but it is next to impossible to ascertain from the study of development whether this haemal outgrowth is formed behind the anus or before it, inasmuch as the intestine has acquired its complete haemal fixation 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 the haemal side of the body; the pharynx is a wide cavity (not wider proportionately 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, 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 Mollusca 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 cloacal 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 increases in number until it assumes the structure of the perfect 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.

We unfortunately know hardly anything of the development of the Branchiopoda; but so far as the Polyzoa and Ascidioidea 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, as to the nature of the post-abdominal outgrowth in hemal Mollusca and Mollusca.)

**Development of the Neural Mollusca.** — The Lamelibranchiates. — The first step towards the production of the organs from which the adult Mollusca are derived, is the formation in a longitudinal section of one portion of its surface into a disc with mixed edges, provided with very long cilia (fig. 12, t. 1). Next in the inner surface 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 (9). Finally, the hemal surface behind the ciliated disc gradually gives rise to two lobes of the mantle, upon each of which a third lobe of the foot is formed and a foot更大号, eventually appears. As development goes on (3), the neural surface between the primarily approximated oral and anal apertures becomes converted into the large foot and mesosa of the Lamellibranchiates, which serve to lodge the principal parts of the body, the gills being developed into a great process in Gasteropods. 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 cavity, and therefore have not the remotest homology with the pharyngeal branchial sac of Ascidians, any more than the second apical apertures which are essentially dependent upon the gills, the 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 paup. 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 Ascidioidea and Polyzoa. On the other hand, there can be no doubt that the ciliated disc of Lamellibranchiates is homologous with the ciliated lobes of the Gasteropod embryos; and 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 the ciliated disc of the Lamellibranchiates, but the chain of reasoning obviously depends upon whether the ciliated disc does or does not become metamorphosed into the paup— a position which the more requires confirmation as in the Polyzoa the cilia are now entirely known to disappear. However this may be, what has been stated with regard to the main steps in the development of the Lamellibranchiates fully confirms the hypothetical derivation of the type from the Common Plan.

Pteropoda and Pulmoidea. — 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 on each side, and in the Pulmoidea embryos by a contractile organ (the velum hypothalamicum). The primary neural flexure of the intestine in the Pulmoidea, and the development of their mantle in front of the anus (that is, the development of an abdomen), are fully demonstrated by late 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 production of the anterior part of the epipodium, which usually disappears in the adult.

Cephalopoda. — In both of these sub-systems a much higher development before leaving the egg, and the modifications which its primary form undergoes are extremely intricate. The first organs of the Cephalopod which appear in the developing embryo cast the mantle, which is simply a thickening in the middle of the hemal surface with somewhat raised edges; around this is a surface representing the mesosa and foot, at one end of which is the mouth, and at the other or anal extremity are placed two little processes, the rudiments of the gills. Again, on each side of the mantle the mesosa 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 grow outwards in the shape of lobes for some distance anteriorly, but for almost the whole length of the sac posteriorly, give rise to the mantle cavity (v. 2). The intestine passing into the abdomen thus formed becomes completely enclosed in the cavity of the mantle, and the complete organ, open towards the neural side. 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 detached from the body, and the whole of the 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 acetabulariform arms (v. 3).

Such in a very short abstract of Professor Kolliker's most valuable Entwicklungs-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 necessity for considering the development of the separate families of these Molluscs, as the process, as far as we know, is the same in all. We will take that of a Nudibranch (Antitupa cristata) as a type, having recently had occasion to go over it with especial reference to the palate here under consideration.

The end of the process of yolk-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-droplets) is the umbilicus, a thin, acellular, dermic layer investing the remainder of the yolk. 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 (t. 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 lateral ends of the acellular layer; on the opposite a delicate transparent cup, the future shell. The line of the future side of the position of the hemal surface and mantle appears (t. 2) by degrees the hemal surface becomes more and more prominent, and the shell larger. With this prominence the embryo is transposed to the right side, so that its position becomes quite asymmetrical (t. 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 by 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 and the outlines of an alimentary canal, consisting of a rounded gastro-hepatic mass and a narrower intestine, which turns abruptly forwards and upwards, to end on the right side more or less hemiyclic in the before-mentioned prominence, whose position has become thus extensively absorbed, diverticulated by a variety of folds, and by pushing-in of the integument around the anal prominence. Two things are obvious in this series of developmental changes. In the first place, the primary asymmetry of the embryo; secondly, the gradual asymmetry brought about in the development of the 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 Mollusca from the Archetype, and to this extent only one point remains to be considered—developed hemal surface is to be considered as a post-abdomen, that is, as a post-anaI portion of the hemal surface.

This view has been taken in deriving these forms from the Archetype, because it is much the more readily comprehensible, and has many structural facts in its favour; but we are by no means prepared to assert that the post-anaI
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 Monstrosities. We shall not treat of monstrosities in plants. The study of such growths is not a mere matter of curiosity, as their structure tends to throw light on the true laws of development amongst plants. Monstrosities are more easily made on plants than on animals for the reason of ascertaining 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 the majority of cases being present in the earlier 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. [Leaves.] 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 whole families, the leaves become opposite or whorled. In the case however of individuals it does not infrequently happen 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 is always opposite, it has now and then, its leaves arranged alternately in a spiral upon the stem. (Lankester in 'The Report of British Association,' 18th meeting, p. 55.)

In the formation 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. [Bracts.] 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 frequently occurs in the genus Plantago, giving the inflorescence a singularly 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 Composite, neither the leaf nor its axil is represented in the axils; but in the case of the monstrosity of the common daisy (Bellis), 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. [Calyx.] It not unfrequently 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 Gorse, Adonis, and Common mustard. Thus, in the case of Calycophyllum stanleyanum, one of the sepals after the corolla drops off begins to grow into a beautifully rose-coloured leaf. Other instances in this kind are seen in the Buttercup. In plants with inferior fruits (Favor) the germen seems to continue in the axils below 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 sepalary 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-Beard (Tragopogon pratensis), in which the pappus surrounding 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 has a tendency to relapse to the foliar condition, that the whole of them partake of this character. Thus Mr. Austen has recorded very accurately the changes observed in a monstrous form of the White Clover (Trifolium repens). The following changes were observed in his specimens:—

1. Calyx teeth often rise into single leaves, but when compound leaves are formed the division seems to be as follows: the two large equal teeth, which are opposite the vexillum, form one serrate leaf, and another leaf is formed from the axils, remaining entire.

2. Corolla.—The part which here most frequently reverts to a leaf is the vexillum, and this is a perfect one. Of these leaflets, the one are often seen forming simple leaves, as the carina; but their perfect union into a ternate leaf is less common.

3. Stamens.—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 tertiary leaves form the calyx and corolla, it might be supposed that these leaves 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 stamens of the flower reversed, in some cases form more than a simple leaf; and it is therefore probable that the ten stamens (9 + 1) may be formed out of four sets of tertiary leaves.

4. Pod.—From the well-known character of the pod and pistil of Mentha, it might be expected that instances of the 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 inwards.

"Ovules seem to be produced only where juncture of the edges of the pistil-leaf takes place; in other cases leaflets are produced in the place of ovules."

On the other parts of the floral series has been regularly developed, the Pistil occasionally will take the form of a perfect tertiary leaf, and then the axis of the plant is continued through the flower." (Austen, 'British Association meeting'.)

Mr. Austen has likewise recorded in the same place an instance in which the staminal flowers of the Common Maize (Zea Mays) were converted into pistils. In this case we have an instance of the tendency of an organ not to relapse 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, and in the gun; in dragonfly, the bachelor's-buttons, and others, the 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 stamen 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 innumerable oranges, in which this fruit is split up into the same number of parts as it possesses carpelar leaves. [FLOWER.]

The most central organ of the plant is the Seed, and its development is the great object of the production of the flowering plant. The young pod is green ever but a changed bud, and during the process of its development it sometimes recovers to the condition of the leafbud, and produces instead of an embryo a branch. These instances will be sufficient to show how instructive the study of vegetable monstrousities really is. Many such have been recorded, and one of the best resumés of the whole subject will be found in Moquin Tandon's 'Terentologie Vegetale'. [METAMORPHOSIS OF ORGANS.]

MONTAGU, A genus from Lamellibranchiatea Mollusca, belonging to the family Kelliidae. The shell is small, thin, equivale, inequilateral, transversely oblong or obliquely oval, surface smooth or concentrically striated, or more or less finely grooved; beaks inflected; inner margina smooth; hinge-margins with a triangular incision and cartilage pit, and a pair of diverging laminar teeth in one or both valves; ligament internal; muscular scars suborbicular; pallial impression simple; animal oblong, its mantle freely open in front with the body and the anterior part of the mantle not furnished with spiny tubes posteriorly; a single siphonal orifice, none foot; very large, strong, and broad, furnished with a byssal groove. Such are the characters of this somewhat unsatisfactory genus as given by Forbes and Hanley. They enumerate three species as British—M. ferruginosus, M. allecincta, M. subtrigassa.

MONTAGU, BASIL, Queen's Counsel, was born April 24, 1770, in London. He was a natural son of John Montagu, 2nd Earl, who had been brought up in the house. His mother was Miss Ray, who was slain 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 jealous frenzy. Basil Montagu received his early education at the Charterhouse School, London, of which the Earl was a member. He was afterwards 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 1792, leaving him a competent income, of which he immediately availed himself. He was educated to the study 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 Lincoln's Inn. He had set himself up as a tutor, and lived in an intimacy with Coleridge and others of that literary connection, and became so zealous a convert to the opinions of Godwin that he had serious thoughts of relinquishing the profession of a lawyer, as 'injurious to society in proportion to the power and attainments of the individual'. He was Mackintosh, however, with whom he travelled for some years on the Norfolk circuit, convinced him that the doxa of Godwin was not founded in truth, and he continued in the legal profession. He never rose to eminence as a pleader, 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 Summary of the Law of Set-off, with a State of Cases argued 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. His most important legal work was 'A Digest of the Bankrupt Laws, with a Collection of the Statutes, and of the Cases argued and determined in the Courts of Law and Equity upon that Subject,' 4 vols. 8vo, London, 1805, 2nd edition, 1819. This 'Digest' became the 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 Partnerships,' 2 vols. 8vo, by W. Johnson Neale, 8vo, 1830. His other legal works and compilations, partly in his own name, partly in conjunction with others, are too numerous to be quoted. Lord Erskine, during his brief tenure of the office of first chancellor (1806-7) made Mr. Montagu a commissioner of bankrupts. While holding this appointment, and deriving a considerable income from it, he became so convinced of the delay and expense to suitors of this mode of administering the law, that he published a yearly detail of these injuries to the public, together with a demand to Parliament for a Committee of the House of Commons, finally put an end to those commissionerships. A new law was made (1 & 2 Wm. IV. c. 80), under which three judges constituted a Court for the trial of bankrupts. This was similar to those previously exercised by the commissioners 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 government of the Bank of England interest for the bankruptcy money in their possession, which had never previously been paid. His demand was at first resisted, but ultimately he obtained 80,000.

The works and compilations by which Mr. Montagu is best known to general readers are the following:—Selections from the works of Taylor, Hooker, Hall, and Lord Bacon, with an Analysis of the Advancement of Learning,' 1801; 1805. The analysis is carefully executed, and very useful for those who wish to study Lord Bacon's treatises. 'The Opinions of different Authors on the Punishment of Death,' 3 vols. 8vo, 1809-13. In furtherance of these 'Opinions', he prepared a book, entitled 'The diffusion of knowledge upon the punishment of death.' His efforts for the abilities of hanging for forgery and other crimes without violence, in conjunction with those of Sir Samuel Romilly, Mr. Wilberforce, and others, were at length rewarded by complete success, and the Death Penalty to the Edinburgh Times was abolished 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 other...
The 16th volume, in 2 parts, contains Montagu's 'Life of Bacon,' which, though not distinguished by much power of thought or beauty of style, is a useful exhibition of the leading events in the latter part of Bacon's life. Of the manuscript, dedicated to Mr. Joseph Montagu, was in the hands of the writer, and was translated into French. Montagu assisted in the establishment of several mechanics institutions, and frequently gave lectures in them. He seems to have been not only an industrious and useful lawyer, but an honest, liberal-minded, and benevolent man. He was a frequent contributor to the Gentleman's Magazine, and his poems, in France, when the age of thirty-five he had been twice a widower, both wives having died in childbirth, leaving him four children. In 1608 he married the widow of Thomas Skipper, Esq.; with whom he had four children, three sons and a daughter, and his eight children only a son and daughter are living. His daughter-in-law, Miss Ann Skipper, is the wife of Mr. Procter (Barry Cornwall).

H. G. MONTGOMERY. [CALAMAS, S. Z.]

MONTGOMERY, 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 Antrim, Ireland, where his father continued to labour in the Moravian settlement at Fulneck near Leeds, in Yorkshire, to complete his education, and in 1793 his father and mother went to the West Indies as missionaries, where they died in 1790. At Fulneck the instruction was excellent, but the moment he left school his life flowed on among the habits of his ten years' residence, 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 when, on his thirteenth year, some poor imitations of Moravian hymns. Though characterised by his teachers as indolent, he had contrived to procure and read a copy of Cowper's poems, and these he thought he had composed himself, and wrote, on the sand lines, and commenced a serious epic, to be 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 business, at least for a time." A situation was soon after offered to him, and he accepted it, and was probably not much more attentive there, for it is stated that he continued to write poetry and compose music till June 1789, when he ran away. He had only a trifle of money when he started; but on reaching Wentworth, he procured three guineas, and bought a coat; and gave him a guinea. He then settled for a twelvemonth at Wath-upon-Dearne as assistant in a general shop. The brethren at Fulneck 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 in Palmerston-row, London, followed him it followed him 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 it might have been 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 published by Mr. John Miller, which he offered to Mr. Lane, of Minerva-press celebrity, who declined it, because the characters swore too much. The novel was never published, but the objection greatly hurt the religious feelings of Montgomery, who thought he had only imitated'>
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 Shefield, and funds were subscribed to establish a missionary in Toeburg, where his parents had died, the town of which he had named Montgomery. When released from his constantly required attention to the newspaper, he took a lively interest in municipal affairs, and was a frequent speaker at religious meetings. In 1833 he delivered a series of lectures at the Royal Institution on '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 British Colonies,' to which he was himself a contributor. A work of great interest and value. In 1833 he reluctantly 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 Glasgow University. He was knighted 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 to 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 received everywhere with great distinction, particularly in the north of England, where he met with the greatest public reception, and was made a burgess. In 1842 he visited Ireland on a similar errand, saw his old abode at Gracehill, and while occupied in these religious labours often observed being boarded on the ship without. In 1852 he delivered a lecture 'On Some Passages of English 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 Shefield were closed, as all classes, many members of the municipality attending the funeral, as also did the vicar of Shefield and twenty-four clergymen. By his will he left 900l. to be distributed to various charities. His memorials have been collected 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 1828 he published 'The Age Reviewed; or, a Satire;' an octavo volume, the poem being dedicated to the Deity; it became astonishingly popular, and eight editions are said to have been sold in 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 1829, dedicated to Sharon Turner, 'Satans' quickly followed. All were successful; and encouraged by this success, and the advice and assistance of Mr. B. Turner and the Rev. W. L. Bowles, he entered himself at Lincoln College, Oxford, with the intention of devoting himself to the Church. He graduated B.A. in 1833, passing in the fourth class, and M.A. in 1838. His residence at the university he provided himself with a new subject for his poetic muse, and in 1831 he produced a poem, with historical notes and engraved embellishments, under the title of 'Oxford,' which, though extremely laudatory, created more ridicule than applause among the members of the university. In 1832 he published 'The Messiah, a Poem, to the Tune of ‘Hallelujah chorus;' dedicated to the Duke of Wellington; and in 1833 'Woman, the Angel of Life.' In 1835 Mr. Montgomery was ordained, and for a time his ministerial labours seem to have nearly superseded his poetic efforts, a small volume containing observations and scenery around his first curacy, Whittington in Shropshire, being published early in 1842. He quitted Whittington in May 1836, and became minister of Percy-street chapel, London; whence he removed, about the beginning of 1838, to St. Jude's Episcopal chapel in Glasgow. Here he continued until December 1842, drawing large audiences; but his preaching excited 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 1843 he delivered his ministrations at Percy-street Chapel, which he continued till his death. He began the publication of a number of prose theological works, the issue of which was continued to 1854. Neither was poetry altogether neglected. Besides some smaller things, he wrote in 1847 a series of 'Meditations upon engraved plates.' The subjects, published by Fisher; 'Sacred Meditations and Moral Themes;' Svo, 1847; 'The Christian Life, A Manual of Sacred Verse,' 12mo, 1849; 'Lyra Christiana—Poems on Christianity and the Church,' 2vo, 1849; 'Loves on Delightful and Distinctive Syllogisms,' 12mo, 1851; 'The 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 unrecompensed by any preferment 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 unblushing paffery. That his works have been most inordinately puffed is certainly true; but no amount of puffery would have carried a poem through twenty six editions (which the 'Omniscience' has) and reached a hundred thousand copies, if it did not contain something, if it did not contain something truly new and original. He may be found in the gravely important nature of the subjects he has generally chosen, and the class, a numerous one, which he peculiarly addressed. This class, rejecting poetry as a merely intellectual amusement, having no interest or affection for poetry, they welcomed him on account of his themes; he was earnest and sincere; and, prejudiced in his favour, to them his turgidity appeared eloquence, his obscurity assimilated to the mysterious, his vagueusness kept him clear from the narrow ministration of doctrine. His themes, though often selected without taste and scattered without fitness, kept attention alive; and as so voluminous a writer it would be scarcely possible not to find some passages containing good thoughts. However, it is only right that we should acknowledge as excellent the object of criticism. As a preacher he drew large audiences, and his services were often a-keel and given in favour of charitable purposes. His style of preaching in some measure resembled that of his poetry; he ranted, was affected, and vague; but his chief appeal was accepted as earnestness, his affectation as refinement, and his vagueusness 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 their appreciation.

MONTICELLIUS. [MINERALOGY, S. 1-1]

MOORE, THOMAS, was born in Augier-street, Dublin, on the 28th of May, 1779. His father was a small tradesman, but his mother's family were of the higher rank, and he was early placed at school under a Mr. Whyte, who paid much attention to elocution, 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 1770 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 1790 he contributed two poems to 'The Boy's Own Paper,' and a translation of the 'Legends of Hope,' 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 him to be a lawyer, induced his father 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 inability to sustain himself without the assistance of the college, he occasionally took some English verses, which were approved of by the judges, and for which he received a reward. He continued also to write verses for the 'Anthology' while it was in progress, and to perform occasionally at the Drury Lane theatre, and to play the piano from his sister's teacher, Italian from the priest of the family, and French from an emigrant acquaintance. In the second year of his college attendance he soared yet higher, and wrote a masque with songs, which was performed in his father's drawing-room.
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Born a Roman Catholic, accustomed from infancy to hear the
wrongs of his fellow-religionists descanted on, influenced by
the teachings of his father, and perhaps by the more generous
son to the 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 for
himself undemonstrated—when the events occurred in the
plots preparatory to the rebellion of 1798. 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, it being necessary in those days to have seen
the so-called odes of Anacreon, a specimen of which he
bought from the provost 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 very popular. Kearney and his brothers were
living at the Middle Temple in London, whither he went, scantly
supplied with money, to study law. In London he was in-
truded to Lord Moira, Lady Donegal, and others; he moved
in a fashionable circle; he published in 1801 his Odes
Anacreon; and of course paid little attention to his legal
studies. His next publication, in 1802, was 'The Poetical
Works of the late Thomas L'Ette,' for which he received
60l. They were severely blamed and much read, and their
scoffers were disposed to place them on a level with
his friends, on account of their poetical ability. In
1803, by Lord Moira's influence, he was appointed to a
government situation in Bermuda. In January 1804 he
arrived there, having purchased a property of about 1,000 acres
in Virginia.

He at once found that the situation did not suit 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. The negroes were a special
society in America he was much dissatisfied, and recorded
his sentiments in some satirical poems. In November 1804
he was in England. Here he expected much from
Lord Moira's patronage; but only succeeded in obtaining the
appointment of deputy of the Custom House in Dublin for his
father.

In 1806 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
cause of much murmuring 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.
Appointed one of the King's Harlots, his attention was
attracted to Bunting's collection of Irish melodies, and at intervals
he had written words for several of them, which he was accus-
tomed to sing himself with much effect. In 1807 he entered
into 'The Fudge Family in Paris,' a series of poetical stories,
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In 1809 he published '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 attempted.

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 his opera of 'M.P. or the Whigs' was produced at Drury Lane. It was 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 now reprinted), were much admired. Some time after he returned to Paris, where he now made up his mind to live by his pen; he quitted London, and went to reside with his family at Mayfield Cottage, near Ashbourne in Derbyshire, where in 1818 he produced the 'Twopenny Post-Bag, by Thomas Brown the Younger.' The

It was written in this style, the viewpoint of the poet, he was directed against the Prince Regent and his ministers, and 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, and his friend Mr. Perry of the 'Morning Chronicle' stipulated for him with Messrs. Long,
man, the publishers, that he should receive for a quart 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' it is one of the few poetical romances in which the
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
poet sometimes divides his poetic gifts to the advantage of
the prose of 'Lalla Rookh,' he made a trip to Paris in company
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 at Paris on the 12th of
August 1804. In 1817 he lost one of his children. Early in 1818 he learned that his
deputy in Bermuda 'after keeping back from me the paper
receipts of my office,' he wrote in his letters "that 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 little was hoped to be
recovered from the deputy. 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 Mr. Rogers on his journey to Italy, visiting
Chantrey the sculptor, and Jackson the painter. This expedition was
recorded in 'Rhymes on the Road,' published together with
'Fables of the Holy Alliance.' 'The Sceptic' had been sent to be 'extracted from the Journal of a Travelling Member of the Poococurate 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, setting for his family, took up his abode
at Paris, where he continued until 1822. He purposed
to work hard; but the gaiety of the place, the interruption of
visitors, and probably anxiety as to his ultimate loss,
prevented his carrying his intentions into full effect. He
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
'The Pirate.' In 1824 he left France, and was in the
possession of only additional works produced during his residence abroad.

The claim with regard to the Bermuda defalcation had by
this time been settled by Mr. Moore's friends in London,
heaving been reduced to 400l., which was paid by a cheque
from Lord Lansdowne, and repaid by Moore, chiefly from
the proceeds of his 'Loves of the Angels' and his 'Fables of
the Holy Alliance.' He now settled at Sloperton Cot-
tage, near Bowood, the residence of the Marquis of Lans-
downe; and there he composed and published 'The Pirate.' He
at once began in earnest his 'Life of Sheridan,' which was
published in 1825. In 1827 'The Epicurean' was
published, with some fragments of a poem called 'Alciphron,'
on the same materials.

Before he left Paris Moore had presented Moore with his
manuscript autobiography, for his special benefit, but not
to be published till after his death. In this year, in order

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To raise money, Moore had sold it to Mr. Murray, with an express condition that he edit it, for 2000 guineas; and the manuscript was assigned to, and deposited with him, in April 1834. In this month Byron died; and on the news reaching England, Moore was anxious to redeem the manuscript, which he considered he had a right to do; Lady Byron and the family were disinclined to publish it just at that moment, and in any case they considered its publication would be alike hurtful to their feelings and injurious to the character of his Lordship, and offered to repay Mr. Murray the sum he advanced. Moore refused to accede to this; he was willing to defer to their feelings, to suppress or alter what was unfit to be made public, or even to burn it if competent persons should decide that its publication would be improper; but insisted that in any case he alone should be the loser. After a long and unpleasant conference, he was repaid the money he had advanced to Mr. Murray, the manuscript was burned, and he engaged for the like sum to write a 'Life of Lord Byron' for the Messrs. Longman. This he did, but ultimately the copyright was transferred to Mr. Murray, by whom it was published in 2 vols. 4to in 1839. In 1831 he wrote 'The Life of Lord Edward Fitzgerald; and 'The Summer Fête,' celebrating an entertainment given at Boyle Farm in 1837. To this followed 'The History of Ireland,' which appeared in 'Larrikin's Almanack' in successive volumes. This was his last work of importance. In 1835, during the administration of Lord Melbourne, a pension of 300l. a year was bestowed on him by the Queen as a reward for his literary merit. It was bestowed in good time: he had become unwell and was not only poor and retired, but bereaved. He was distressed by this, and on hearing the news, his two sons, one died in Algeria in the service of the French, the other died of consumption in 1842. In 1841 he commenced an edition of his collected poetical works, including the scattered pieces with which he had enriched almost every newspaper and magazine of the metropolis, and which they were issued in ten monthly volumes. For the last three years of his life he was afflicted with a softening of the brain, which reduced him to an imbecility, though without pain, during which the sedulous attention of his wife was most exemplary. He died on the 22nd of February 1852, and was buried in the churchyard of Bromham, near Devizes.

Of Moore's critical genius we have already spoken. To his prose there is less to be given. His biographies, with many sparkling passages, are all faulty, diffuse, and uncharacteristic. His 'History of Ireland' is his best work, as it is an interesting and careful production, though not an impartial one.

Moore's character in many respects was truly estimable. His affection for his parents was unflagging and indestructible: he carried him in early life safely through the second condition of fatherhood, as he would commit no extravagance that might require him to run into heavy expenses; it induced him to postpone his own hopes of official advancement to the provision of a small place for his father, and of the 300l. received for 'Lalla Rookh,' 2000l. was applied to the establishment of a pension for his mother and his parents. To his wife and family he showed the fondest attachment, and it was duly reciprocated. He had been urged against him that he too often left his wife in solitude while he was thronging in fashionable circles; but it should be remembered that he believed numerous of his fame, and consequently his fortune, depended on his keeping himself well before that world which alone could become purchasers of the expensive quarters in which shape his works first appeared; nor was there any doubt that even in the humblest of his circles he was always avowed himself proud of his wife, introduced her to all his aristocratical friends, and frequently urged her to mix more with them, which her native good sense made her desire as much as possible, while she ever willingly submitted to those abstinence she considered useful to their mutual interests. As a friend he was faithful, kind, and generous; and he secured the esteem of many of the most eminent men of his day. As a politician he was consistent in his principles, though he was not always right or always unchangeable in his opinions. He was vain yet few men have had so much pains taken to make them so, petted as he was from his boyhood till old age withdrew him from the world, and his vanity was harmless and never obtrusive. The strongest proofs of his humility were given in his last known publication after his death in the 'Memoirs, Journal, and Correspondence of Thomas Moore,' by Lord John Russell, in 1863-35, in 8 vols.

MORACEAE, a natural order of Exogenous Plants which were formerly placed as a sub-order of Urticaeae. The species are trees or shrubs, with a milky juice, sometimes climbing. The leaves are commonly lobed and rough. The flowers are small, monocious, and collected in heads, spikes, or catkins. The ovules are solitary and suspended. The fruits are capsules, burs, or nutlets. In the middle of fleshy albumen, hooked, with the radicle long, superior, folded down towards the cotyledons.

Although the Mulberry and Fig grow in Europe, all the Moraceae are extratropical. They are natives of the temperate and tropical latitudes of both hemispheres, often forming vast forests. The genus Ficus is the most distinguishing feature of this order. [Ficus.] Most of the plants of this order furnish caoutchouc. [Cauuoucnc.] The fruit of the 'Breadfruit,' or 'Sugar-apple,' is a good article of food; the leaves of the Silk-Worm. [Moou.] Several species of Derronia are used in medicine. [Derronfia.] Other genera of this order yielding useful products are Broussonetia and Maclura. [Broussonetia; Maclura, S. 2.]

This order embraces 8 genera and 184 species.

MORCHELLA, a genus of Fungi, one of the species of which is eatable. [M. esculenta, the Morel, springs up in orchards, woods, and cinder-walks, early in the spring and eats the young green fruit. Common Morchella is a species of the same genus that has been found in forests where fir trees have been made. The country people in Germany are so persuaded of this, that they formerly set fire to woods in order to obtain a crop of morêls, of which they are very fond. At last the practice was put down by law. This fungus has a thick, yellowish subperitical cap, from the size of a pigeon's egg to that of a swan's, hollow, pale-brown, or even grey, and deeply pitted all over its surface, the depressions being separated by raised ascomatining lines. The plant is a small, slightly and an agreeable taste, and is employed for various purposes of both fresh and dried. In the former state it is most commonly stewed or stuffed with force-meat; in the latter it is employed as an ingredient in sauces. In this country it is of rare occurrence.

MOREL. [Morchella, S. 2.]

MORETON BAY. [Australia, S. 2; Wales, New South.]

Moringaceae, small natural order of Exogenous Plants, embracing the species of the genus Moringa. They are characterised by the possession of a many-leaved caïy, perigynous petals and stamens, 1-celled anthers, stigmate and consolidated siliquose fruit, and seeds without albumen. This order is referred by most botanists to a position near Leguminosae, but Lindley places them in his Phloxidae. They are natives of the East Indies and Arabia. The root of Moringa pterygosperma has a pungent odour with a warm biting and somewhat aromatic taste. The seeds contain rich substances, and are used by the Chugees 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 dissolve in water. The uses to which this oil is applied 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 less into the parts of the flower in plants. It is now however generally recognised as the science of form in the organic kingdoms. Schleiden, in his Principles of Scientific Botany, treats of what is usually called the structure of plants, under two heads, that of 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 deals with the parts as the union of the parts and the 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 separable into one that treats of the delimitation of external form, and the delimitation of internal structure of the peculiar composition of plants and their parts from various tissues.
widely distant members have perhaps no element identical, if we would attain to scientific knowledge, if we would understand nature, and not merely acquire a disjointed, uncomprehended, and incomprehensible acquaintance with it. In these considerations it follows, setting the paramount importance of the morphological method of observation, that we gain nothing by the comprehension of the forms compared, but that the method of morphological development, and direct our scientific inquiries, 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 in the unchanging form is 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 a theory of organic physiology, if we could but succeed in completing the theory 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. Although without this, botany would be wholly divested of all scientific principles. This deficiency renders it impossible as yet to treat morphology with scientific logical development, or in accordance with a perfectly fitting mode of arrangement, as will but too obviously appear in many manœuvres, 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:

1. We have just seen that the individual is the foundation, and to delineate the forms themselves. The first remains 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 series of forms 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 return to Seguin’s doctrine of organic development, especially when 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. It is in consideration of this that we must accept the permanence and the change of the form, as permanent, but an ever-changing one. The analogies 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 or hypothetical form, and then continues to change, 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 taken as an end; it is at last; but in the conception of which we must comprehend the whole series of changing forms, wherein the
of North America in 1798. 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. Mr. Morton was in the habit of going 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 office, gave him a good hand in the management of his laboratory, and education 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. He was graduated M.D. in March, 1820. He was at the same time admitted a member of the Academy of Sciences (Philadelphia). Soon after this 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 Corporis Dolore." During his period of preparation for graduating in Edinburgh he visited France and Italy, and made a stay in Paris. He returned to America in 1824, and in 1825 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 Dr. Robert Owen at New Harmony. Morton became an active member of the Academy of Sciences, and 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. One of the most important of these papers was 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 commendations by European geologists. He cultivated generally the natural history sciences, and wrote several papers on zoological subjects.

While pursuing natural history with success, he did not neglect to keep up the transactions of the Academy. In 1834 he published a work entitled "Illustrations of Pulmonary Consumption; its Anatomical Character, Causes, Symptoms, and Treatment." He also edited an edition of Dr. Macintosh's "Practice of Physic," with notes and additions. From 1839 to 1843 he filled the chair of anatomy in the medical department of Pennsylvania College. In 1840 he published "An Illustrated System of Human Anatomy, Special, General, and Microscopic." His previous labours, 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 constitution, and especially in the structure of the skull. During his researches, he amassed collections of skulls and extant, and 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 not procure for me a cranium of each of these races, and all I had at command was a Malay, an Australian, and one from the Malay or the Malayan. Forcibly impressed with this great deficiency in a 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' ''Crania Egyptica.' These works embraced not only an account and illustrations of the skulls, but general ethnological observations on the races of men. The collection on which these works were founded is 631 of the largest and best prepared from all parts of the world, 278 crania of mammals, 321 of birds, and 68 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, and to express the opinion of the existence of a diversity 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. Nutt and Gliddon, contains a large mass of matter by the editors and others, with many "Excerpts" from Morton's inedited papers. In these he undoubtingly avows his belief in an "aboriginal plurality of races," and expresses his conviction, that "man will yet be found in the fossil stage as he is in the Eocene deposits, and that he walked the earth with the megalycon and palaeotherium." 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 endorsed his more recently enunciated views. Mr. Morton died at Philadelphia, after a short illness of five days, on the 17th of May, 1851.

MOSANDERITE. [MINERALOGY, S.1.] MOSQUITO. Following is an account of the structure of the Mosquito of the Americas, 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 antennæ 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 foule places, especially sinks and privies. The female, on the other hand, gives greater extension to her paws, her antennæ, and her mouth parts, in order to cause the incon siderable disturbance and vexation during the summer and autumn months.

"The head of the male mosquito, about 0.67 mm. (milli metres) in length. The eyes, which are disposed in front superiorly are found two pyriform capsules nearly touching each other, and having implanted into them the very remarkable antennæ.

"The capsule, measuring about 0.91 mm., is composed of a horn-like substance, and is attached posteriorly by a pedicle, while anteriorly it rests upon a horn ring, united with its fellow by a transverse frenulated band, to which it is joined by a thin elastic membrane. Externally it has a rounded form, and is internally cumbers a certain sort of lamp-shade with a constricted near its middle; and between this inner cup and outer globe there exists a space, except at the bottom or proximal end, where both are united.

"The antennæ of are of nearly equal length in the male and the female.

"In the male the antennæ is about 1.75 mm. in length, and 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 fenestrated skeleton with an external investment, and terminates simply posteriorly, but is encircled anteriorly with about 40 papules 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 whorl.

"The two last joints have each a whorl of about 20 short hairs near the base.

"In the female the joints are nearly equal, number but 13, and form a sort of a whorl of about a dozen small hairs around the base. Here, as well as in the male, the parts of the antennæ 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 supply the auditory organ with a fluid nourishment. The capsule is about 0.23 mm. in length, containing five teeth belonging to the incisors. These teeth are divided into two portions. The central teeth continue forwards into the antennæ and are lost there; the peripheral ones, on the contrary, radiate backwards in every direction, three being in the cranial space, and are lodged for more than half their length in sulci wrought in the inner wall or capsule.

"In the female the disposition of objects is observed to be nearly the same, excepting that the capsule is smaller, and the teeth of the cranial joint are reduced to one. The female proboscis does not differ materially in the two sexes; but the palp, 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 2-73 mm., while the proboscis measures but 2-16 mm. They are curved upwards at the extremity.

"If an organ of hearing, similar to that described by Tre-
virius as belonging to the Blattia orientalis, exist in the head of the M. diabolus, the tympanum must be of extremely
minute proportions, because the head, which has a diameter
of only 0·67 mm., is almost entirely occupied by the corneal
plaque, the capsules, and the attachments of the neck and
of the buccal apparatus. The membranes tympanic must
then be reflected inwardly, for the organ to be really held
in vibration by any sounds other than those infinitely more
acute than are produced by the insect itself, and the use of
such an organ for the purposes of intercommunication must
be considered highly improbable. Such an organ is to be
found in the head, nor very certainly, also, in the body;
and we are obliged to look for some organ which may
answer the requirements of an effective auditory apparatus.

The position of the capsules strikes us as extremely
favourable for the performance of the function which we
assign to them: besides which there present themselves
in the same light the anatomical arrangement of the capsules,
the disposition and lodgment of the nerves, the fitness of the
expanded whorls for receiving, and of the jointed antennae
for directing them. The whole appears as the result of
modulations created by sonorous modulations. The intra-capsular
fluid is impressed by the shock, the expanded nerve appreci-
ates the effect of the sound, and the animal may judge of
the duration and quantity of the impression; of the pitch, or quality, by
the consonance of particular whorls of the stiff hairs, according
to their lengths; and of the direction in which the modula-
tions travel, by the manner in which they strike upon the antennae,
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
soon see the female, for the tympanum either in the dim light
or in the dark night, when nothing save her deep sharp
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 which the others never reach. In these views
we believe ourselves to be born out by direct experiment,
in connection with which we may allude to the greater dif-
culty of catching the male Mosquito.

In the course of our observations we have arrived at the
conclusion that the tympanum is of considerable extent,
as organs of touch in the female; for the palpi are extremely
short, while the antennae are very movable, and nearly
equal the proboscis in length. In the male however the length
of the antennae are far greater, and we cannot look for the seat of the tactile sense elsewhere; and in fact
we find the two apical antennal joints to be long, movable,
and comparatively free from hairs; and the relative mo-
tion of the remaining joints very much more limited." (Dr.
Christopher Johnston, Quarterly Journal of Microscopical
Science.)

MOTACILLA, MOTACILLINÆ, [BLUE BIRD; BLUE
BEAK; SYLVIA; WAGTAIL.]

MOTELLA, a genus of Fishes belonging to the family
Gadidae. It has the following characters: Body elongated,
cyindrical, 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 tail.

M. vulgaris, Mustela marina (Rays), Gadus trique- tratus
(Bloch), the Three-Bearded Rocking, Sea-Loche, Whistle-
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 rays, is as 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 commences
along the back to the tail, being partly visible when the fish is
along the back to the tail, but ending a little shot of the
base of the caudal rays; ventral fins with the first two rays
elongated, the second most so, the two distinct; the other
five rays nearly equal, united, and short; pectoral fins rather
large, horizontally prolonged, reaching nearly to the anal
fin. Black, with a brown edge on the head, the back of the
chin and the end of the fleshly 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 rays in number are—2nd 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
eyes in each; the inner eye has a white ring, the outer
side the middle, between the lip and the nostril; inner part
of the upper lip crenate; the ridges golden yellow; the
anterior portion of the body of the fish cylindrical, or slightly
depressed; the tail compressed; the general colour of the
body and head is yellow, with silvery brown, spotted 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 the anal while.

Young fish of this species are of a uniform brown colour,
until they have acquired 6 or 7 inches in length; in this
condition they are the Mustela alia of Ray. (Yarrell.)

This fish is common on the coasts of Cornwall, and also
on the coasts of Ireland.

M. cinerea (Gadus cinereus, Linnaeus), the Four-Bearded
Rocking. This fish has been taken in Scotland, and is
common in the Baltic and the southern coast of Sweden.

M. quadrivittatus, Brunni (Gadus quadrivittatus, Linnaeus),
the Five-Bearded Rocking. This fish is common in the
British coast. Its habits resemble those of the Three-Bearded
Rocking, and by some naturalists it is regarded as a variety
of that species.

M. planiceps (Ciliata glauca, Couch), the Mackeral Mides.
This fish has been taken on the coasts of Cornwall by Mr.
Coush. 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. argenteolus, (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 Pro-
vinces, which form a part of the British possessions on
the eastern side of the Bay of Bengal. Moule in is situated
north of the mouth of the river Salay, at the confluence of the
rivers Salay, Aitven, and Yang, in 10° 20' N. lat., 97° 44' E.
long.; the three rivers when united are called the Moule in
River. It is 10 miles S. by E. from Martaban, and 30 miles
N. by E. from Amherst. (Amherst.) Moulen has a good
harbour, which admits vessels of 600 or 800 tons. Being
secured from temporary disturbance of the French, who
import and export, 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, consisting of Chinese, English, Dutch, tintorers, rice, tobacco, ivory, stick-lace, cocoa-nuts, and live-stock. The imports are cotton
goods and other manufactures.

MONTMELlick. [Queen's County.]
MOUNTRATH. [Queen's County.]
MUCIC ACID. [Chemistry, S. 1.]
MUCORACEÆ, an order in Lindley's alliance Fungales.
The species have a fleshy thallus and the spores surrounded
by a vesicular veil or sporangiurn. They are amongst the
smallest forms of Fungi, and attack decaying vegetable and
animal matters. They are frequently known by the name
of Moulds. (Mouldness; Fungi; Entophila, S. 2; Moulds.)

MUDARIN. [Chemistry, S. 1.]

MUDGE, WILLIAM, LL.D., F.R.S., a major-general in
the army, the third in succession of the directors of the
series of geodetical operations, which resulted in the
Triangometrical Survey of Great Britain and Ireland, the
production of the 'Ordnance Maps' by its means, and the
measurement of the English Arco of the Meridian. The
history of family and hereditary talent, and the occupation
of certain offices by a succession of gifted men, have
frequently been illustrated in this work. They are again
briefly touched upon by Mr. J. G. Cooper, in his Rev. ZACHARY MUDPUS, sometime master of the Grammar
School at Bideford, in Devonshire, and vicar of Abbotsham,
afterwards a prebendary of Exeter and vicar of St. Andrew's,
Plymouth, was the author of an "Essay for a New Version
of the Psalms," and the same year was nominated Member of
the Royal College of Physicians, being elected by the
volume of sermons published in 1727. He died April 3rd, 1769, and
was eulogised by Dr. Johnson, whose intimate friend he had
been. THOMAS MUDUS, 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, Ramden, Troughton, and De Lucy, declared in 1757, that he 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 invention and perfection of asteam engine. In 1760, 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), at 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-western tract of the British dominions, as 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 maps placed at General Mudge's disposal, and from the want (since supplied) of a legislative enactment for the preservation of the various trigonometical observing stations throughout the country, which want sometimes led to a transfer of the points to the care of levelling officers, to the prejudice of the survey; 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. As., vol. XIII., p. 31.)

General Mudge was afterwards appointed lieutenant-governor of the Royal Military Academy at Woolwich; into the administration of which he is stated to have introduced many excellent regulations, which were afterwards extended, and adopted by the cadets 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 Antiquities, a member of the Geographical Society, and 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, Lidcombe, on the 7th of April, 1821, in his fifty-eighth year, leaving a widow, with three sons and a daughter.

Of 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 P.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 business of the Trigonometrical Survey of Belgium, where the results of the Survey were laid down, 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 Steighnagh on the 24th of September, 1854, aged sixty-five.

MUDWORT, the common name of the species of the genus Limosella. This genus belongs to the natural order Scrophulariaceae. It has a 5-cleft calyx; a 5-fid bell-shaped corolla; a globose, papillate capsule, with a central placenta, free, or connected with a short dissepiment below, 1-celled. L. aquatica is only British species. It has lanceolate leaves, which are toothed, and pedicel axillary, concealed; shorter than the pedicels. It has small white or rose-coloured flowers. It is found growing in muddy places, where water has stagnated.

MULET. [Moolids; Mulds, S. 9.]

MULUS, a genus of fishes belonging to the group Aetho-tergei and the family Percidae. The species have the body thick oblong; profile of the head approaching to a vertical line; scales large, deciduous; two dorsal fins widely separated; the pectoral fins well above the pelvic fins; the gill-covers raised and flexible; teeth on the lower jaw and palate only; two cirri at the symphysis of the lower jaw; branchiostegius 14-14. There are two species of this genus found in Europe, and both are inhabitants of the seas of Great Britain. M. Aethopis, the Striped Mullet (M. leuca, Steind) has the following fin-ray formula:—D: 7–1+6; P: 17; V. 5–1+6; A: 2-5+6; C: 13. The forehead, nape, cheeks, and operculum are corred.
Mr. Yarrell states that the Spotted Gannel of America is identical with the British fish.

**MUREX**

**MUREXIDE** [Chamartín, S. 1.]

**MUSCALES**

**MUSCALES** [Chamartín, S. 1.]

**Acrogeous Plants in Lindley's arrangement of the Vegetable Kingdom. It includes two divisions:—1. *Hepatica*; 2. *Musci.* The *Hepatica* include the orders Rícicaceae, Marchantiaceae, Jungermanniaceae, and Lacióideae. The *Musci* include the orders Androcides 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 silks. This disease is caused by a fungus belonging to the genus *Botrytis,* and has been named by Balsamo and Montague B. *Basiana.* This plant, which is characteristic of the disease, can be propagated by the inoculation of a healthy caterpillar. The result of the changes 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 *Lepidóptera* can be inoculated by the spores of the fungus. 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 overcrowded, and that they have a sufficient supply of fresh food. The predisposition to this disease is among some species of butterflies, and causes as those which act upon the human system, and render it favourable to the attacks of epidemic diseases.

(Robin, *Histoire des Végeaux Parasites*)

**MUSCA* orbicularis,* a common black ant of the coast of Arabia, is found in the province of Oman, is situated on a peninsula which is joined to the island of Muscat by a reef of rocks, in 23° 48' N., 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 headland dominate the whole of the port. The town is surrounded by walls and turrets built with stone houses, and is accordingly 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 entrepot, 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 Madagascar. In the trade between Arabia, India, and Africa and China, they may be set down as belonging to Muscat. The port is resorted to by ships from every port of Persia and Arabia. British and French merchants trading to the Peninsula of Muscat are very numerous. Besides its maritime commerce, Muscat carries on an extensive trade with the Arab tribes of the interior. The principal articles of the commerce of Muscat are—saffron, almonds, raisins, pistachio nuts, souchote aloes, gum ammoniac, sulphur, gum copal, and saltpetre. Other articles are frankincense, pears, gall-nuts, coffee, cocoa-nut-oil, galbanum, hides, cotton-wool, mother-of-pearl, gum, bees-wax, raw silk, indigo, tortoise-shell, rhinoceros-horns, pepper, cochineal, cinnamon, sugar, rice, sandal-wood, dates, saffron, 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 tissus imported at Muscat are British and American long-cloths, British calico-prints, India shawls, Chinese silks, &c. The country near the town is barren; but pro visions, fruits, vegetables, and fresh fish are abundant in the markets. Bullocks, sheep, and annals are to be had at a reasonable price. The usual 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 duties are payable on fish. There is a large town called *Muttra,* 3 miles to the westward, nearly as large as Muscat. There is a good road between the two places. At Muttra vessels can be hailed ashore. In the interior there is another large town called *Rostam.*

Muscat was a place of considerable trade before the arrival of the Portuguese in the Indian Ocean, and it was then
subject to Oman. Alberquerque took it in 1507, but had immediately to put down a bloody insurrection of the Arabs. On the same year the Portugeuses, with the primary 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. The town of Mascate is the principal seat of the Arabs. It is situated near the top of the Muscat peninsula, and is approached by a narrow isthmus, about one mile in width, which is crossed by a wooden bridge. The town is built on the hilltop, and has a picturesque appearance.

Left to themselves, the Arabs of Muscat—expert seamen, skilled in the use of fire-arms—soon raised a maritime force which became the terror of all the neighboring coasts, but also the European powers, all of which desired to hold them in check. The Portugeuses themselves mastered several places in the Persian Gulf, and were threatening Gomhoura; 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 Muscate Arabs." In 1707 the Portugeuses obtained permission to build ships at the ports of Pegu from the king of that country; and their fleets, consisting of ships of 20 to 50 guns, annoyed trade in the Persian Gulf. The British, however, had now a footing on the lower coast of the Red Sea, and were more important in holding the line 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 on the east coast of Arabia. In the Middle of the 19th century the British had no connexions with the Muscat government; and the British and European powers were thus in a better position to control the sea trade of the Persian Gulf than they had been at any previous time.

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 Bahrein Islands and the pearl-fishery contiguous to them; and the coast of the Makran. In Africa he claims sovereignty over all the coast from Cape Delgado to Cape Gardafui, including the ports of Montgomo, Lindi, Quila, Melinda, Lamoo, Brava, Magdoua, &c.; and the valuable islands of Malac, Comor, Remba, Socota, &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, and in his vast and illimitable dominion he is absolute and uncontrolled. A foreigner may walk the streets of Muscat at any hour of the night unmolested. Goods are piled up in the streets exposed night and day, and no one ever attempts to molest them.

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 present received by him by princes under his sway. His naval force, more efficient than that of all the native emperors and princes from the Cape of Good Hope to Japan, numbered in 1837 15 vessels, carrying from 6 to 74 guns; 60 baghehas (one-masted vessels of 200 to 300 tons), carrying 10 to 15 guns; 10 balloons (100 to 200 tops), carrying 4 to 6 guns. The number of vessels belonging to the port of Muscat at the same time, was estimated at 2000 of 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 power, and to resist all pretensions over all the territories he claims as his own.
ridicule which has been thrown upon this opinion in a recent
entomological work, it appears, from still more recent inves-
tigations, that the theory is far from being hitherto advanced.
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. Bymer Jones, in his "General Outlines of
the Animal Kingdom," 1864, says: — "The House-Fly is fur-
nurished with a minute series of suckers or tubules, visible un-
der the microscope, are seen to be covered with innumerable hairs
of the utmost delicacy; these flaps, or suckers, as they might
be termed, adhere, &c."

The description of the foot of the fly has recently been ex-
anamated by Mr. Hepworth, who says: — "The fly 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
underside of the segments forming an arched convexity, 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 fasciculi of a large muscle
pair; these are placed at its base, and (sometimes protected by a
'coat of mail,' formed by long scales overlapping each other
as a Venetian blind, or in alternate ones, as the scales of
a fish, &c., but more frequently wanting) expand in a radi-
ating manner from the base so that the ends pass along with its fellow
on each side, gives off a number of tubules alternately with
them; these dip downwards from the under surface, and
become expanded into trumpet-shaped extremities, the flap,
becoming thinner and thinner as it approaches its margin,
while sometimes terminates in an irregular serrated apex,
and at others by finely pointed hairs. The fly has the
power of attaching itself to smooth surfaces by these trumpet-
shaped extremities, and also of secreting a fluid from them,
when vigorous, and it has occasion to make extra exertions
but in a partially dormant state (the best for making observa-
tions), it does not appear to be able to give out this secretion,
even though it cannot attach itself; indeed this fluid is not
essential for that purpose: when it is secreted, it is deposited on
the flap with the concavity of the segments, and generally,
and from the necessity of secreting the maximum fluid to
preserve these markings by applying colouring matter
whilst they were moist, but have not yet succeeded.
The tubules are often seen protruding from under the margin of
the flap in a semi-arch-like form, giving it a fringed appear-
ance. The foot of the male Dytiscus is a type, not only
of many of the beetle tribe (not aquatic), but of the whole of
that of flies possessed of flaps. The first joints of the tarsi of
the anterior legs of this insect are extremely dilated so
that a band of membranous flap forms on each side of the
inferior surface of this expanded portion, it is seen to be
covered with a great number of sucking cups, two or three
being larger than the rest, but they form collectively a very
powerful instrument of adhesion." (Quarterly Journal of
Mus. Mus., S. 1.)

MUSCLES. [MUSCULAR TISSUE. [Tissues, Organic, S. 1.]

MUSK-BOAT. [Ceratodidae.]

MUSK-ORCHIS. [Hérmium, S. 2.]

MUSK-ÖX. (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 exhaled 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.

MYCETCHARUS. [Corticiidae.]

MYGINDA. [Ampullaceae.]

MYPHONUS. [Coniidae.]

MYOPTERIS. [Chloropteris.]

MYOSURUS (from μύος, a mouse, and σύρε, to pull, the
seed being sown on a long receptacle which looks exactly
like a tail, a genus of Plants belonging to the natural order Ranunulacae. It
carry a calyx of 5 sepals, prolonged into a spine at the base; the petals 5, with a fil-
atum tubular claw; the capsules closely imbricated upon a long axis, regisses for 2 to 3 years, if the embryo
inverted with the radicle superior. The only
species of this genus is M. minus, which has a simple
leafless single-flowered stem 2 to 6 inches high. It
has a very long receptacle, numerous carpels, and many large
It grows in damp places and in fields. It is a native of
Europe and America. The American plant has been de-
scribed as M. Shorti, but there is every reason to believe it
is the same as the British and other European plants.

MYRIAPODA, a class of Invertebrates Animals belong-
ing to the class Articulata. This order is represented by such species as the
Centipede and Gallow-Worm. They may be regarded as an intermediate form between the lower
and higher forms of animals. They are provided with
the Annulose 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 the most peculiar eyes than any of the
Vermiform tribes, and their respiratory organs. The 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
plates. The legs and other appendages are inclosed
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 Vermiform tribes, and the other
to that of the higher Articulata; in the former of which the
Tulis (Gally-Worm) may be taken as an example.
The body is generally cylindrical, or nearly so; the number
of the segments is variable; they have a pair of thread-like legs, so
that the number of these members 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 distinct, that they are unable to support it. The animal,
with their assistance, like a serpent or a worm, than to use them
as their proper instruments of locomotion. This kind
of movement is facilitated in some species by the incomplete
inclusion of the body in the consolidated integument, for
this merely forms plates above and below, 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 speed. Still the animal, instead of relying
on such legs for propulsion, possesses a considerable
flexibility; and they are thus enabled to wind their
way with facility through very narrow and tortuous
tubes, without injury. The animal, after having--

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 for-
wards, which is distributed to the body and respiratory
organs. In the higher forms respiration is effected by mea-
s of tracheae, 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 meet above the esophagus,
and form a two-lobed mass, from which nerves proceed to
the eyes and antennae. In many parts of the double series
of cords the ganglia of each side unite. The muscular
apparatus is very complicated, consisting of a series of distinct
muscles for different purposes. They have a pair of
ovaries and testicles, and 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 penultimate
segment. In the formation of the larva the head remains
and they go on increasing in number till there are sixty or
seventy. The larva has no legs, these organs making their
3 L 2
appearance after the first moult. During their growth these animals have a considerable power of regenerating lost portions 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—\textit{Chilopoda} and \textit{Chilognatha}. \cite{Curtis, Curtius.} The following synopsis of the genera of these two orders is drawn up from the list of the specimens of \textit{Myriapoda} in the collection of the British Museum (1844):—

\textbf{Order I. Chilopoda.}


\textbf{Order II. Chilognatha.}


protruding their bodies. Some have black points 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 Vinegar-worms, and their commonest food is the ammoniacal exudate of the amateur microscopist is an example. It also appears to embrace the Syllogra of Lamark, the Proto of Oken, and the Clypeus of Swann.

The compounds of Carbon and Hydrogen, frequently found in the neighbourhood of coal-deposits, and in other parts of the earth. It contains 82.2 of carbon and 14.8 of Hydrogen. It is a limpid or yellowish fluid, lighter than water, and hence called Mineral Oil. Its specific gravity is from 0.83 to 0.86. It is sometimes called a substance called Petroleum on exposure to air. It may be obtained from Petroleum by heat, which causes it to pass off in vapour.

Vapours issues in large quantities from the earth in Persia and the Birman Empire. At Ranang, on one of the branches of the river Irawaddi, there are upwards of 500,000 naphtha and petroleum wells, which afford annually 419,000 hogsheads. In the peninsula of Belcheri, on the western shore of the Caspian, naphtha rises through a marshy soil in vapour, and is collected by sinking pits several yards in depth, into which the naphtha flows. There is a abundant spring near Amiana, in the Duchy of Pras. Mr. Dana says that in the United States it was formerly collected for sale by the Seminoles, and that the late General Marion used it commonly called Genesee or Seneca Oil, under which name it is sold in the market.

Petroleum is used as lamp-oil in Birma, and when mixed with water, is called a “Kerosene” lamp. It is used for fuel and light by the inhabitants of Bagou, on the Caspian. The vapour is made to pass through earthen tubes, and is inflamed as it passes out, and used in cooking. The spring at Amiana is used for illuminating the city of Genoa.

Naphtha has been recommended as a 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 alkalies potassiam and sodium, which cannot be kept in contact with any substance containing oxygen.

The Ranang 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 in a solid form, from which candles are made.

(From: Manual of Mineralogy; Gregory, Handbook of Organic Chemistry.)

**NAPHTHALINE. [CHEMISTRY, S.2.]**

NAPIER, SIR CHARLES JAMES, G.C.B., was the eldest son of Colonel the Hon. G. Napier, comptroller of ascension and other charters, and nephew of Charles, second duke of Richmond. He was born at Whitehall, 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 1806, having obtained his company, he joined the British forces in Spain, and commanded the 50th regiment of foot during the extraordinary campaign under Sir John Moore, on which occasion he received five wounds, 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 compulsory inactivity by writing on colonies, colonisation, and military law, 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 Coa, and was carried into the hard-fought battle of Fuentes de Oñoro, and in the second siege of Badajoz, as well as in a considerable number of lesser skirmishes. In 1813 we find him serving in the Netherlands, and having no longer need of his services, and occupying his time by the capture of American vessels, 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 Cambrai, and accompanied the British army to Paris.

Not long after this, while stationed in the Ionian Islands, he was appointed governor of Cephalonia. Here his administrative powers were first developed; and the success of his governorship is proved by the fact that to the day of his death he retained the title of Lord Viscount of Cephalonia. In 1831 he returned to England, and received an annual tribute of the produce of their vines. While holding this post he joined with Lord Byron in a scheme for the deliverance of Greece. He was shortly afterwards superseded on the latter ground, but continued to pursue his agricultural in a most successful manner. In 1838 and 1839, Sir Charles Napier, now a major-general, was ordered in 1841 to take command of the 3rd division of the army. This was the beginning of his military 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. Since at this time was in a very disordered condition, and the British influence and prestige had been much impaired by the disasters in Cabul. The Ameers of Sind were perfidious, and as they would be bound by no treaty, he resolved to subdue them by open attack. From the first, his plans were eminently successful. He blew up the fortress of Emam Ghur, which was always deemed impregnable. Having accomplished this exploit, which was characterized by a large amount of bravery, he proceeded on with the capture of the whole province and extraordinary of all military feats, he pressed on, and with a very inferior force in point of numbers routed the Ameers at Meenanee, February 17, 1843. In a few days the army took Buner, and after passing the province of Hyderabad, and outflanking Shere Mohammed (surnamed the Lion) on the other side, drove him 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 organised the provincial government, and the collection of taxes, amended the native law, put down the ‘sutter’s system’, and set the tenures of land on a more just and judicious footing. Whilst 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 Lucknow to make war on the Ameers, and in that time he had made the march to Emaum Ghur in the great desert, gained two great battles, reduced four large and many smaller fortresses, captured six sovereign princes, and subdued a great kingdom. He created and put into the administration of Scinde, and under 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 establishments in the public service, and had prepared and for greater ones, not only suited to the exigencies of the moment, but having also a prospective utility of aim." And all these works he performed in spite of a press of correspondence, long journeys on camels 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 Scinde without some permanent proof of his ascendancy over the popu Indian, and of the consciousness of having contributed to the temporary prosperity, he persuaded the people 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 reembarked for India in March 1846, at the suggestion of Government. On the 25th of December he went to theMahamadnagar, where he received the reverse of which we had sustained in the Sikh campaign. Happily however on his arrival at Bombay he found that the tide had turned, and that his military services were no longer so urgent as they had been, and that he had more leisure to enjoy the pleasures of his field, and no principality to administer; so he set his active 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 1852. 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 campaigns, and was buried in the grounds attached to the mansion chapel at Landport, near Portsmouth. Sir Charles Napier was twice married—first in 1827, to Elizabeth, daughter of John Oakley, Esq., of Deal, Kent, by whom he had two daughters; and secondly, in 1835, to Frances, daughter of William Phillips, Esq., and widow of Captain R. Alcock, R. N. A bronze statue of the conqueror of Sinde has been erected by subscription in Trafalgar-square.

NAPLES.—The territorial divisions of the kingdom of the Two Sicilies are divided into 15 provinces, the areas, subdivisions, and population of which are given in the subjoined table. The provinces beyond the Faro are given under Sicily, &c. 2.

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Area in Square Miles</th>
<th>Districts</th>
<th>Communes</th>
<th>Population in 1851</th>
</tr>
</thead>
<tbody>
<tr>
<td>Napoli</td>
<td>381</td>
<td>4</td>
<td>65</td>
<td>862,142</td>
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<tr>
<td>Terra-di-Lavoro</td>
<td>2,493</td>
<td>5</td>
<td>230</td>
<td>752,013</td>
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<tr>
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<td>168</td>
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<tr>
<td>Principato Ulis</td>
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<td>128</td>
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<tr>
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<td>414</td>
<td>4</td>
<td>121</td>
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<td>2,916</td>
<td>3</td>
<td>62</td>
<td>318,415</td>
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<td>53</td>
<td>477,423</td>
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<tr>
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<tr>
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<td>321,747</td>
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<tr>
<td>Total</td>
<td>32,475</td>
<td>62</td>
<td>1,840</td>
<td>6,021,892</td>
</tr>
</tbody>
</table>

Population of Sicily at the Census of 1861: 2,091,880
Total population of the kingdom of the Two Sicilies: 6,704,472

NARBERTH. [Pembroke.] NARCISUS, a genus of Plants belonging to the class Ephedres and the natural order Amaranthaceae, among which it is known by its flowers growing upon a scape, and having a cup at their mouth; the stamens, which are opposite the sepals being longer than the others. It consists of bulbous plants principally inhabiting the warmer parts of Europe. The following is the arrangement of the European species of this genus given in Mr. Wood's 'Tourist's Floras':

- A. Leaves flat, linear, obtuse; tube of corolla short, obversely conical; crown campanulate dentate.
- 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. Minor, a native of Europe.
- N. Incomparabilis 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.

I. Scape nearly terete.

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.
- N. radiatus. Scape 1-flowered; striate. It is found in Austria, Styria, and the Valtellina.
- N. Silenus, with linear-obtuse keeled leaves; scape compressed, 2-edged, striated, 3-flowered, crowned, very short, concave, crenate at the pale margin; the petals of a pale sulphur colour. It is found in sandy fields in the south of England, and in Ireland, also in France and Italy.
- N. palaetus, N. procax, and N. Tazetta, are other European species belonging to this section.

b. Crown and petals white.
- N. polyanthus. Scape slightly 2-edged, 8-20-flowered. It is found near Toulon and Nice, in stony places.
- N. nivens. Scape 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 convolute-setaceous.
- N. tenuissima. Scape 1-flowered. It is found near Palermo, on open hills.
- N. cynapiifolium has the scape 3-flowered, and is found on the coasts of Corsica, Sardinia, Calabria, and Sicily.

D. Leaves semi-cylindrical and crenellated.
- N. Lautis has the scape 1-2-flowered. Found near Grasse, in France.
- N. ochroleucus. Scape 4-8-flowered. Found in fields near Toulon.
- N. odoratus. Scape 1-5-flowered. It is found in the fields and olive grounds of Lucca.
- N. jonquilla, the Jonquil. Scape 2-6-flowered. It is found in Italy. N. intermedia 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 is found in the 'Amaranthaceae of the Honourable and Reverend William Herbert, p. 329 (Svo., London, 1837), who however divides the genus into six sorts, after the example of Salisburry and Haworth; but as these genera are not likely to be adopted by botanists, with the exception perhaps of the genus Cortusella, no account need be given of them. With regard to Corbridaria, 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 Bisaye and the Pyrenees, but now lost in the French list.

NATALS, a British colony on the south-east coast of Africa, is bounded S.W. by the river Utuaco (about 30 miles W. from the Umsimudula, the previous boundary), N.E. by the river Tugia, N. by the Drenchenberg or Quatlabma Mountains and the S.E. by the Indian Ocean. The colony lies between 20° 20' and 30° 50' S. lat., 30° 40' and 31° 25' E. long. The area is about 29,000 square miles. The white population in 1853 was 7039, the native population 112,936.

The Drenchenberg or Quatlabma 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 8000 feet above the sea, and the summits are covered with snow at least four 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 25° 50' and 31° S. lat. practicable for horses or coachages, and there are very few for pedestrians. Coal occurs not far from the sources of the Tugia, and ironstone is frequently found. Copper has been discovered within 20 miles of Pietermaritzburg. In Natal the country gradually rises from the sea to the foot of the mountains. A few mountainous groups occur which are offsets from the Drenchenberg 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 Tugia and the Umzimudula; they both rise in the Drenchenberg Mountains. The Tugia receives several tributaries, of which the principal is the Drakenstein, which forms a portion of the boundary to the north, and the Bushman River; and it reaches the sea in 29° 16' S. lat., 31° 22' E. long. It has a bar at the
mouth, and is not navigable. The Umrincula flows through a rugged and almost inaccessible country, and falls into the sea in 30° 50' S. lat., 29° 20' E. long.

Along the coast, in summer, the average temperature is about 74° Fahr.; in winter about 63°. 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 soil is generally very fertile throughout the Cape Colony, and does not 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-eaters, and porcupines are numerous. The hippopotamus abounds in several of the rivers, and in the Tugela there are numbers of small crocodiles. The larger antelopes are becoming scarce; but there are still many of the smaller ones. The giraffe, a beautiful and graceful animal, is abundant.

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, Durban, Bophutatswana, and to a tract in the south-west part of the territory. 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 offshoot of the Drakensberg Mountains, in 29° 30' S. lat., 3° 0' E. long., about 50 miles W.N.W. from Port Natal. It contains a barracks, 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 29° 53' S. lat., 31° 3' E. long. Verulam, Windsor, and Western 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. The total number of the inhabitants in 1845 amounted to 25,464 15s.; the export duties of the colony amounted to 54,285 15s.; the value of the exports in 1845 amounted to £124,723 2s. 9d.; the value of the produce exported being £9,905,838 15s., of which the wool exported was valued at £1,474,116. A bishopric of Natal was created in 1853. There are episcopal ministers at Pietermaritzburg and D'Urban.

The colony of Natal owes its origin to the Dutch boers (farmers), who in the year 1836 emigrated northward beyond the Orange River, and crossed the Vaal, the Tugela, and the Drakenburg Mountains, settling in small communities 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 Zooloos, Retief continued the autocratic policy of his predecessors, and arrived at the treaty by massacre. The Zooloos were reduced to 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 perfectly friendly festivities. The farmers scattered over the territory of the Zooloos, next attacked successively, and upward 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 expedition after expedition against Dingaan, in February 1838, succeeded in putting him to flight. The Queen of 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 acknowledge their 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. A 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. 68, which enables the Home Secretary to sign 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 being a member of any Company of Weds; and the rights, when granted, are considered to confer the alien a temporary character only as a subject; that is, the alien cannot, on returning to his own country, claim the protection of British law as a natural-born subject. The same statute declares the right of every person who is an citizen to hold every species of personal property, except chattels real; and every resident alien any to hold lands or houses for residence, trade, business, or manufacture, for a term not exceeding twenty years; but this exception 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 descent, purchase, or succession; and it naturalizes 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 a jury de modicate lingue.

NAUVOO. [Utah.]

NAVARRETE, MARTIN FERNANDEZ DE, a Spanish scientific naval officer and historical investigator, who had the good fortune to bring to light materials of inestimable value at the decline of the old and in the age of the modern era. His life is a history of travels and of discoveries, of expeditions and of misfortunes. He joined the Spanish fleet under Cordova, which, during that part of the American war, cruised unassailed in the English Channel; and he was at the disastrous attack on the Spanish floating batteries on Gibraltar, in September 1782. After some cruises against the Moors and Algerines, Navarrete was, in 1789, obliged to quit active service for some time on account of the state of his health, and his character of a soldier became that of a peaceful scholar. He was appointed a member of the commission from the new king, Charles IV., to examine the national archives to form a collection of documents relative to the naval history of the kingdom, and in particular that of the voyages of discovery which have conferred such immortal fame on the nation. Navarrete's great work, the first volume of which did not appear till thirty-six years after. In 1793 the Spanish declaration of war against the French republic recalled him to sea, and in 1794 the declaration of war with England kept
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 in the navy could possibly be. At the close 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-instated in office as soon as Ferdinand returned, and for many years continued to be the Admiral of the Black Sea, but left behind him a vast store of Hydrographic works, 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 seal for literature, he wrote a volume of poems, 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 Academy 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 are of great importance from the information they contain. He held his offices and also a distinguished place in the literary society of Madrid through several revolutions; and in 1834, when the Estatuto Real was published, on the morning of November 29, he was one of the first peers created. He died at Madrid, on the 8th of October 1844, at the age of seventy-eight.

The great work of Navarrete is the 'Coleccion de los Viajes, descubrimientos y exploraciones de los españoles desde fines del siglo XV.' ('Collection of the voyages, explorations, 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 1833, the third in 1839, the fourth and fifth in 1842, 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 wrote the new matter which it supplied into the 'Life 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 'Memoria' was published in 1831.

Navarrete was a man who let no day go by without searching into something, who habitually read with a pen in his hand, who made notes from his memory for future use, 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 interfered with his dignity as an historian. Perhaps he did himself an injury by the learning with which he loaded his volumes. In his 'Coleccion the number of new documents brought forward in each volume is often said to be almost as much as one hundred, and while the work is one which is absolutely indelible in the annals of Spain, it is not encumbered with large libraries, nor intended 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 volumes of the Hakluyt Society, Mr. Major's letters of Columbus, is for the most part taken from it; and there are few other documents in the collection of such surpassing interest as these.

Under a work which Navarrete was connected with was the 'Coleccion de Documentos Inéditos para 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. He was the editor, and in 1846, in a letter to the editors on bringing a number to Navarrete once remarked "Well, volume three is done at last;" "Three," the old man replied with vivacity, "I wish there were three hundred, and that I saw them on my shelves. Without such publications we shall never have a history of Spain." He died when it had reached the fifth volume, and the last numbers we have seen belong to the twenty-fifth, and were issued in 1855, by Don Miguel de Salvá and the Marquis de Pidal, the latter a member of the Spanish Cabinet, and also eminent for his services in the collection. A number of new facts which he had unearthed by patient research. A work entitled 'The Life and Writings of Cervantes, by Thomas Roscoe,' which was published by Tegg in 1839 as a portion of Murray's 'Family Library,' appears to be entirely taken from Navarrete, without acknowledgment; at least in several passages that we have compared we have been unable to discover any difference. A history of the part that the Spaniards took in the Crusades, which was contributed by Navarrete to the 'Memorias' of the Spanish Academy of History, and a translation of which was inserted by Michael in his 'Histoire des Croisades,' was a portion of a general history of maritime affairs in Spain which he left behind him complete, and which is likely to be published by the Spanish Academy. A work on the discovery of Mexico and California was issued in 1846 as a Dissertation on the History of the Nautical and Mathematical Sciences in Spain, which Navarrete had, it is said, been at work upon occasionally for fifty years.

Navarrete's last work was a selection of letters which is a view of the discoveries of the Spaniards on the western coasts of North America, prefixed to a narrative of the 'Voyage of the Sulit and Mexican on the Coast of California,' published in 1802. The book was frequently referred to in the disputes between the English and American governments respecting the Oregon territory.

A collection of the smaller works of Navarrete, 'Coleccion de Obras Menores,' was commenced in 1848 by his sons, but has not been carried further, we believe, than two volumes, though it was intended to consist of five or six, containing a selection from his correspondence, and an extended account of his life and times. The two volumes mainly consist of short biographies of Spanish literary men and seamen, which had mostly been scattered in periodicals and transactions of academies.

NAVENBY. [LINGWORTH]

NAVICULA. [DIATOMACEAE. S. 2]

NAVY BAY, a natural harbour lying between the Atlantic coast of American Columbia on the west and the island of Manoula on the east. The island, which is a mile and a quarter long, a mile broad, and covered with luxuriant trees and shrubs, is separated from the mainland at its southern extremity by a channel of about 100 yards wide, but is only 10 feet deep. The projecting reef stretching out from the mainland, the southern extremity of the bay forms a natural breakwater. The harbour thus formed is accessible at all seasons; it is secure in every wind, with a depth of 6 to 7 fathoms in the middle, and 3 to 4 fathoms within 60 feet of the shore, and capable of containing 300 sail. Navy Bay is the Atlantic terminus of the Panama railway, which from hence to Gatun (7 miles) is carried over a swamp supported on piles. A lighthouse has been erected at the western point of the island.

NAMEHILL. [CUMBERLAND]

NEANDER, JOHANN AUGUST WILHELM, Professor of Theology in the University of Berlin, and a member of the Consistory of the province of Brandenburg, was born in the house of his father, J. G. Neander, at Quedlinburg, October 25, 1780. His early youth was spent in Hamburgh, where he was educated at the Gymnasium, and at the Johanneum, a college founded on the site of the old cathedral, in which is placed the large public library. While pursuing his studies here he became, according to his most sincere and zealous friend, assuming the name of Neander ('a new man,' from the Greek) on his baptism. He then, in 1806, repaired to the University of Halle to study theology, and thence removed
to that of Göttingen. After a short stay in Hamburg, in 1811, he transferred himself to the University of Heidelberg, where he made remarkable philosophical attainments under him, in 1812 he was rising the chair of the History of Christianity and of Christian Life, between 1816 and 1839. 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 1832 and 1845. The history, he says, 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 has been to the Christian Church a similar history, the notes of his next work, "Geschichte der Pfänzler и Leitung der Kirche durch die Apostel," in 2 vols., published in 1858-33. In these works he has with great ability combated the errors of St. Paul and of the earliest church, which he was ever as active an opponent as Schleiermacher, Hengstenberg, or Tholuck. In 1838 he issued "Das Leben Jesu in seinem geschichtlichen Zusammenhange" ("The Life of Jesus in its Historical Relations"), a work which was written in direct reflection of that of Strauss bearing a similar title, and which has his "General History of the Church," and the "History of the Apostolic Church," have had great influence in England, and been highly valued. His reputation as a lecturer was also great, and his lectures were numerous attended. To the north-western direction, its course being westerly and its length from north to south is 55 miles; its breadth is about 30 miles; its area is 1278 square miles; and its population in 1862 was 601,034. The province is traversed by several rivers of moderately high forestclad valleys, in the west or western direction from the Rhine, below which it turns to the north-west, crosses the territory of Baden till it reaches that of Hesse-Darmstadt; of this it forms the boundary to its entrance into the Rhine at Mainzheim, a course of about 170 miles. The Neckar receives in this province the Neck, 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 Neckar district. The lower course of the Neckar has many islands. The land above the river is exceedingly rich and fertile. The chief products are wheat, hemp, wine, silk, and wood. Horned cattle, sheep, and horses of good breed are numerous. Railroads run from Stuttgart to Heilbronn, and from Stuttgart to Ulm and Feucht. The Rhine is navigable from Ulm a line runs east to Augsburg. 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. Towns.—Stuttgart, Cannstadt, Eßlingen, Heilbronn, 38 miles N. by railway from Stuttgart, is situated on the right bank of the Neckar, which is here crossed by a wooden bridge. It is surrounded with high walls and a deep ditch, and contains some good buildings, the most interesting of which are the church of St. Kilian, the town-hall, and the house of the Tentschitc Knights, now used as a barracks. Heilbronn has a gymnasium, a public library, and about 10,000 inhabitants, who are actively engaged in, and in the manufacture of silver ware, carpets, tobacco, white lead, chemical products, gunstock, paper, &c. The navigation of the Neckar below this town is much facilitated by the Wilhelm's Canal. Ludwigshafen, N. of Cannstadt, a mile from the left bank of the Neckar, is a well-built town, with 6908 inhabitants, exclusive of the garrison. The town, which, for its size, is one of the prettiest in Germany, is situated on the right bank of the old German and Flemish schools. The other remarkable objects are the military college, the lyceum, and the arsenal. Woolen cloth, linen, calico, jewellry, leather, nails, and canvas are amongst the industrial products. NECROPHORUS, a genus of Coleopterous Insects belonging...
ing to the family Silphidae. The antennæ are terminated by a nearly globular 4-jointed mass; the body is parallelopediped; and the maxillæ have no horn terminal. There are several species of this genus. They have obtained the name of Burying Beetles, from the peculiar instinct which they exhibit of burying the dead bodies of small animals, such as moles, mice, frogs, &c., as a receptacle for their eggs and larvae. Their power of perception are very strong, and it is surprising how soon they discover a dead body fitted for their purpose, round which they may be observed flying, with the elytra elevated, their dorsal surfaces being applied together. They soon creep beneath the body, and commence securing it, with the antennæ from the sides and under the neck, which by degrees descends into the pit which is thus gradually deepened. When it has reached a sufficient depth, the earth is thrown over it, and the insect deposits its eggs upon it, so that the body when hatched, feeds itself in the midst of a feast, disgusting enough, but suited to its taste. The larva is long, of a dirty-white colour, with the upper surface of the anterior segments armed with a scaly plate of a brown colour, and with small elevated points upon the hinder segments. They have also six scaly legs, and the jaws are robust. When they have attained their full size they bury themselves still deeper in the earth, where they construct an oval cell, the inner surface of which they coat with a gummy secretion. These insects, like many other insects, feed upon carrion, a strong given liking. The habits of these insects have been especially studied by M. Gleditsch, and more recently by various persons in France, who have written upon the subject of destroying these pests, and by whom various points in their economy have been elucidated.

There are a considerable number of species of this genus, some of the largest of which (N. grandis, Fabricius) have been observed in North America. There are seven British species, five of which are distinguished by the golden-coloured bands of the elytra. These species vary amongst themselves in the form of the thorax, the structure of the hind legs, the markings on the elytra, and the colour on the sides of the antennæ. One of the most common species in the Silphia Vespillo (Linnaeus), in which the posterior tibie are curved, and the trochanters furnished with a strong spine. The species vary also in length from half an inch to an inch and a third, which is the length of N. germanicus, the largest and rarest of the British species. (Westwood.)

NEEDLE-ORE. [Mineralogy, S. 1.]

NELSON. [Zeland, New, S. 2.]

NEMALITE. [Mineralogy, S. 1.]

NEMATIC [Mineralogy, S. 1.]

NEMATOIDEA [Echinoderms.]

NENAGH. [Tipperary.]

NERITA, NERITIDÉ [S. 1.]

NERYSY. [Organisms, S. 1.]

NETHHERLAIND. [Tipperary, S. 1.]

The area of the Kingdom of the Netherlands are distributed over 11 Provinces, as follows:

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Square Miles</th>
<th>Population</th>
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<tr>
<td>Guelders</td>
<td>189.9</td>
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<tr>
<td>South Holland</td>
<td>105.8</td>
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<td>Limburg</td>
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Total: 12,5671 8,205,382

NEUKOMM, THE CHEVALIER SIGISMUND, a celebrated German composer, was born at Salzburg in 1775. Being related to the family of Haydn, he received his early musical education from him. He was the elder brother of the author of 'The Creation.' From him Neukomm acquired that predilection for sacred music which distinguished him throughout his career. At the age of twenty he went to Vienna, where he met Haydn, and the friendship thus begun, lasted without interruption during the whole of the great master's life. Neukomm's close and unbroken intercourse with Haydn, and admiration of his genius, had a sensible effect on the formation of his own style, which is marked, not only with Haydn's grandeur, symmetry, and clearness, but with many of Haydn's characteristic traits of musical phraseology.

After having gained a high reputation in Germany, Russia, and England, Neukomm came to America in 1889; and his reception by the public was such as to induce him to pass much time in this country. His residence in England was an active period of his life. He here that his greatest works, the oratorios of 'Mount Stau' and 'The Hope of the Dead,' which were composed to German words, was afterwards adapted by himself to an English version of the text, and performed for the first time at the Derby Musical Festival of 1831. 'David,' the oratorio, which he composed for London, was performed expressly for the Birmingham Musical Festival, and performed in 1834. During the same period he gave the English public many vocal pieces, both sacred and secular, which obtained general popularity. Among these, his sacred cantatas, 'Miran,' and 'The Prophecy of Babylon,' and 'Abelam,' are, remarkable for their grandeur, expression, and perfect adaptation of the music to the English poetry, for Neukomm was a perfect master of our language.

The Sea was for a long time the most popular song of his, and it is still frequently heard, and always with pleasure. Neukomm's latest work was 'Twenty Psalms selected from the authorised English Version,' for the use of singing-schools, choruses, and choirs in England. It was written for the Association for the Revival of Sacred Music in Scotland, and published by that body at Edinburgh in 1853. It possesses great value. The most beautiful of the Psalms are selected, and the music, in a plain and simple style, has the grand and beauty which characterises Neukomm's sacred works. A collection of Voluntaries for the Organ—an instrument on which Neukomm was one of the greatest performers in Europe—is among the most important productions he has left in England. There is scarcely a branch of his art which he left untouched. His instrumental compositions, symphonies, quartets, sonatas, &c., are very numerous and of much merit; but it is on his great sacred works that his permanent fame will rest.

In the course of his long life Neukomm received many of the honours due to the highest distinction in his art. He was invested with several orders of knighthood, in France, Portugal, and Prussia. He was a member of the Royal Academy of Arts in Prussia, and the principal musical institutions in the more important societies in Europe and the United States. He was a Doctor of Music in the University of Dublin, and he was one of the jury of our great London Exhibition in 1851. For several years he was afflicted with an ailment, at one time almost amounting to deprivation of sight; but he partially recovered from it, and, rested at Bonn, enjoying till he was fourscore, a great old age and an honoured retirement. He died in April, 1856.

NEVIN. [Carnarvonshire.]

NEW GRANADA. [Granada, New.]

NEW GUINEA. [Papua.]

NEW JERSEY. [Jersey, New.]

NEW MEXICO, a Territory of the United States of North America, lying between 31° and 38° N. lat., 107° and 117° W. long. It is bounded S.E. and by the State of Texas from which it is divided on the S. by the parallel of 31° lat., and on the E. by the meridian of 105° W. long.; by the Territory of Utah; W. by the State of California; and S. by the Republic of Mexico. The area of New Mexico is estimated at 210,774 square miles. The white population was 61,826 in 1850. The Indian population was estimated by the Commission of Indian Affairs in 1853 at 45,000. The Territory of New Mexico was formed in 1850 out of the country ceded by Mexico to the United States, with the addition of a portion of that claimed by Texas.

Surface, Hydrography, &c.—The Territory of New Mexico, bounded on the Pecos river, and the east by the same, is divided into the two distinct sections, which will probably at some future day be separated into two distinct territories or states: the one comprising the country occupied by the great river, and the other containing the Rocky Mountains. The former, or west of those Mountains. The former, or west of those Mountains.
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 Anahuc, de los Miembros de los Guatils, 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 18,000 feet above the sea. The southern part isn't much elevated, and the eastern range, which runs nearly parallel to the other, is known in the northern part as the Sierra Obscura, and in the southern as the Sierra Sacramento, though the latter name is commonly applied to it throughout. These mountains rise very precipitously to their eastern plains, are black, and knobs variously disposed, with fertile valleys between them. Some of the northern 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 eastern range. Pines generally grow on the higher mountains, oaks and occasionally oaks on the lower ones. The narrow tract bordering the Sierra Sacramento on the east is very elevated, and forms the western boundary of the extensive plain north-west of Texas. The narrow valleys 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 great valley which lies between those 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 mountainous portion especially, with 8000 feet above the sea. 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 sandy, and dry; but where irrigated it is generally very fertile. H.)-low Santa Fe about, is the most fertile part, and there and there crops are often obtained annually. This is the most populous 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, well watered, and appears to be in many parts a fine agricultural country. The middle part is occupied by a great plain drained by the Rio Gila and its affluents, much of which is sandy and barren; but the latter has the advantage of being one of the most fertile parts of the country. The whole is occupied by Indian tribes: the Apaches inhabiting the east, the Shortly, the Navajos the north-east, the Pah-Utahs the north-west, and the Pimos the west and south-west.

The Rio Grande del Norte, or, as it is more commonly called, the Rio Grande or Rio del Norte, rises in the Rocky Mountains, near 40° N. lat., not far from the sources of the Arkansas and Colorado. Its course before it reaches the boundary of New Mexico is generally south-east, but throughout this territory it is nearly south. 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 3000 miles. Throughout New Mexico it is a rapid shallow stream, and has several important tributaries, but is navigable only by canoe, 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 Puerco is its only tributary of any consequence in this territory, though it runs for a considerable distance through a longitudinal valley west of the Rio Sagramento, has, owing to the arid nature of the soil, but little water. The Rio Colorado, which drains the western part of the territory, has its source in the Rocky Mountains 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 such as to make travel by the river difficult. 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 plain noticed 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, with some conformity of configuration with the Colorado, about 35° 45' N. lat. It receives both tributaries 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 Nalapoa and the Yaquiella.

The mountains are composed of eruptive and metamorphic formations; the rocks enumerated consisting chiefly of granite, sienite, basalt, porphyry, &c., but Silurian and Carboniferous strata also seem to have been recognised. New Mexico appears to be rich in minerals, though its resources have not been fully developed. Gold has been found in many places. In the Santa Fé district the peasauny 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 James 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, and not of much severity, and the Colorado is seldom frozen firm enough to admit the passage of cattle. 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 chiefly 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. The only industry in which the country is on the raising of stock. Large numbers of horses, mules, cattle and 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.

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 'samps,' and the chequered woollen shawls for bedding and warming purposes. Most of the imported articles are received by the Missouri overland route by caravans, by way of Independence Santa Fé.

Of the 61,685 white inhabitants, above 58,000 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, fails to their lot, but the spinning of the blankets and woolen wares is chiefly done by them. Of the whites the Mexican is the most interesting. He is of various nationalities, and his family is numerous. They are chiefly what are called Aztec races, similar to those described under AMERICAN ANTIQUITIES, S. L. Several are found along the banks of the Colorado and the Grande rivers and their tributaries. The most celebrated are those known as Las Casas Grandes, on the Gila, noticed under AMERICAN ANTIQUITIES, S. 1, p. 98. Some of equal extent, called La Gran Quivira, occur near the Salinas, between the Rio Grande and the Pecos, about 100 miles S.E. of Santa Fé. The San Juan and San Pedro also contain several ruins, are said to be portions of an aqueduct 10 miles long.

*Divisiones, Towns, &c.*—New Mexico is divided into seven counties. Santa Fe is the political capital, and though there are several other towns, as they form no population as to be of little other than local consequence. Albuquerque, on the left bank of the Rio Grande, 76 miles S. from Santa Fé, 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.
Santo Fé, the capital, is situated about 90 miles E. from the Rio Grande, in 35° 41' N. lat., 106° 1' W. long, on a wide plain surrounded by 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 1681, and consists of narrow irregular streets, with houses of adobe, some of them of a very old form and not having a central area. 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 established two newspapers, one published three times a week and the other weekly. Santo Fé is a place of great trade, being the centre and depot of the overland route by way of Missouri. The climate is severe and little variable, and the town is said to be unhealthy.

The government of New Mexico is based upon the Act of Congress of September 9th, 1850, which established the Territory, and provided that every free white male inhabitant then residing in New Mexico, and all free white citizens of the United States who should subsequently qualify by residence, should be entitled to vote in all elections. The legislative assembly consists of a Council of 13 members, elected for two years, and a House of Representatives of 26 members, elected for one year, as the case may be, and is appointed by the president of the United States. A delegate to Congress is elected by the citizens.

(Statistical Gazetteer of the United States; American Almanac, 1854; Seventh Census of the United States; Oregon and California; Epagne; Pike's Exploratory Travels; Poinset; Lyon, &c.)

NEW ORLEANS. [Orleans, N.]

NEW ROSS. [Wexford.]

NEW SOUTHERN WESTLERS. [WALES, NEW SOUTH.]

NEWBURGH. [Aberdeenshire, S. I.]

NEWCASTLE EMILY. [Carmarthenshire.]

NEWHAM. [Gloucestershire.]

NEWPORT, GEORGES, distinguished as a comparative anatomist and entomologist, was born in the village of Pen Y No, town of Keddington, in 1803. His parents were in humble circumstances, and with but little education he commenced following his father's business. He was indebted to a mechanics' institute at Newport, for first exciting in him a taste for the study of natural history. He became so well known for these pursuits that, when a natural history museum was opened at Canterbury, he was at once appointed curator. Without any guide or direct him, he pursued the study of animals in his own way; and was particularly fond of dissecting any fresh specimen that came under his notice. His love of anatomy and natural history paved the way for his entering the medical profession; and after having served his apprenticeship, according to the requirements of the Apothecaries' Society, with Mr. Wills, of York, and started in the practice of medicine at Lincoln, he entered the medical school at University, now University College. Here he attended the lectures of Professor Grant, and soon found that the work he had been pursuing in his spare time had prepared him to meet successfully the results of his labours to the world. His first paper was sent to the Royal Society, and was published in the 'Philosophical Transactions.' It was entitled, 'On the Nervous System of the Sphinx Liguistri, Linn.; and on the Changes which it undergoes during a Part of the Metamorphosis of the Insect.' This was speedily followed by other papers, which were read before the Royal Society, and published in the 'Philosophical Transactions.' The principal of these were entitled, 'On the Reproduction of Invertebrated Animals; ' On the Temperaturre of Insects, and its Connection with the Functions of Respiration and Circulation in this Class of Invertebrated Animals; ' On the Organs of Reproduction and Development of the Myriapoda; ' On the Structure, Relations, and Development of the Nervous and Circulating Systems, and on the Existence of a complete Circulation of the Blood in vessels, in Myriapoda and Macrouro Anarcha; ' On the Reproduction of lost Parts in Myriapoda and Insects.' He also published papers on myriad subjects in the 'Transactions' of the Linnean Society.

The labours of Newport, as a comparative anatomist, were chiefly confined to the insect tribe. Of all classes of animals, they present the greatest variety of forms, and the largest number of points of resemblance in the animals in which they are placed. They hence afford a wide field for research to the comparative anatomist. It is however few who are endowed with the patience and delicate manipulative skill which the dissection of their delicate organisms demands. From his youth Newport had taken a delight in investigating the structure of insects, and his paper on the nervous system of the Sphinx was received with astonishment, on account of the skill and labour it displayed. In this paper he not only gave a minute account of the nervous system of this insect, but pointed out the relation which existed between the parts of the nervous system in insects and other animals. In the same philosophical spirit he pursued his researches in other departments of insect life. His paper on the existence of a complete circulation of the blood in insects, showed 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 articulata animals, and his researches into 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. A résumé of his own researches upon insect anatomy and physiology, with those of other comparative anatomists, will be found in his article 'Insects,' in the ' Cyclopaedia of Anatomy and Physiology.'

While it is as an anatomist and physiologist that Newport takes a first position, his minor works and papers claim for him an equal portion of attention. As a naturalist, he was diligent in his observations on the habits of insects, as is proved by his prize essay on the 'Habits and Economy of Aethalia centifolia, the Sawfly of the Tarn.' Besides this paper he published many others on the habits of insects. In one of his works he describes of a new genus 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 certain Species of Ichneumonidae and Ichneumonidae, 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 his 'System of Entomology,' the most complete work on the subject, was published 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 had 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 embry of the ovum 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 1854, being desirous of obtaining some new facts on this point he journeyed to where he was exposed himself to the malaria of the ponds which these creatures inhabit, and on the 6th of April sank under a fever thus contracted.

All in all 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 position to offer his men of science, and during the latter years of his life he maintained himself on a pension of 100l. 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 Literary and Scientific Institute. He was also an honorary fellow, and to whose 'Transactions' he contributed largely. He was twice rewarded with the royal medal of the Royal Society, and was a member of the councils of both the Linnean and Royal Societies. His works were highly appreciated by Continental journaleers, and he was a 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 there will still remain the widely known that these sciences are more studied, and 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 United States, the newspapers are classed under 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 claim of 'The English Messenger', of which the first number was distributed in 1766, purporting to be published at the time of the Armada, were suspected not to be genuine. The suspicion was well founded. In 1839 Mr. Thomas Watts, one of the librarians of the British Museum, published a letter to Antonio Faci, Esq., in which he showed that the so-called 'Gazette de Paris', in 1631, are also unfounded, and that the earliest specimen of this branch of literature belongs "to Italy or to Germany." The claim of Germany is strengthened by the fact that Vien, dated sheets containing news were published as early as 1554.

Since the publication of the previous article, the abolition of the advertisement duty in 1853 (18 & 19 Vict. cap. 63); the total removal of the stamp duty in 1855, or at least reduced to a nominal amount on paper of a size and purpose, giving a mark of extent to the extension of newspapers in the United Kingdom. In London there are now (April 1858) published 11 morning papers instead of six. The 'Times,' which usually consists of 16 pages, or two sheets, each consisting of a full impression of one penny's postage, which gives the privilege of circulating by post for fifteen days (18 & 19 Vict. cap. 23); and the introduction of machinery, by which from 10,000 to 15,000 copies can be procured at a penny a sheet, giving a market impulse to the extension of newspapers in the United Kingdom. In London there are now (April 1858) published 11 morning papers instead of six. The 'Times,' which usually consists of 16 pages, or two sheets, each consisting of a full impression of one penny's postage, which gives the privilege of circulating by post for fifteen days (18 & 19 Vict. cap. 23); and the introduction of machinery, by which from 10,000 to 15,000 copies can be procured at a penny a sheet, giving a market impulse to the extension of newspapers in the United Kingdom.

Of the others, the 'Globe,' the 'Sun,' and the 'Shipping and Mercantile Gazette,' are of 4 pages, price 4d. The 'Express' and the 'Evening Herald' are branches of the 'Daily News' and the 'Morning Herald,' price 5d. and the 'Evening Star,' price 1d., is an evening edition of the 'Morning Star.' The 'London Gazette' and the 'Patriot,' the organ of the Independent and Baptist dissenters, are published twice a week. There are also various Tracts for the times, and pamphlets on the 'St. James's Chronicle,' the 'Monetary Times,' and the 'Record,' are published three times a week. Of weekly London papers there are altogether 111, but this includes literary papers, such as the ' Athenaeum,' the 'Literary Gazette,' and the 'Literary and Philosophical Repository,' and various city, commercial, and miscellaneous publications, such as the 'Solicitor's Journal,' the 'Builder,' and the 'Pawnbroker'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 advertisements, some of them covering a great number of subscribers, and some being published at a halfpenny. Some of the other weekly papers are conducted with a large amount of literary and political talent, and are of a higher price, such as the 'Examiner,' the 'Speculator,' the 'Saturday Review,' the 'Press,' the 'Weekly Spectator,' the 'Oxford Review,' and the 'Scottish Review,' and a variety of intelligence, and some of them reach a circulation of upwards of 200,000. Among those which reach a high number are some of the illustrated papers, such as the 'Illustrated London News,' 'The Illustrated Times,' &c. There are many other periodical publications, such as 'Household Words,' 'Chambers's Journal,' &c., which, as they do not contain news, are not included among newspapers. Of local newspapers published in England there are 411, and in Wales 39. Many of these are penny 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 Scotland, and the prices vary from a penny, of which price there are none in Edinburgh, instead of the penny stamp, but 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 published 13 daily newspapers, and the three four-bore newspaper stamp, and the other four an affixed postage stamp.

By the Act 18 & 19 Vict. cap. 27, any periodical publication, published at intervals, not exceeding thirty-one days, of which the price does not exceed the prescribed superfcies, may claim to be stamped as a newspaper; but in the case the title must be printed on the top of every page, with the date of publication; and, when 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 a annual fee of 5d. is charged, the year always terminating on the 30th of June. It is not absolutely necessary 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 place where the newspaper is printed, for the tax (5d. per number) will be given, in which is to be stated—the title of the intended 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 description of the occupier of the house in which it is printed, 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, exclusive 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 declaration is made by the printer or the proprietor 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. Newspapers in print and 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 name and surnames of the owner, publisher, and proprietor, the name of the printer and publisher, the place and year of publication, the date, and the price, under a similar penalty for neglect. A supplement must be not 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 after, if issued by other means, or within three days, under the like penalty of 20l. for each offence; but the penalties can only be sued for by the Attorney-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 superfluity of print, on one side of the paper, not exceeding 2596 inches, whether published as a supplement or not; any other supplement to a duly stamped newspaper not containing a superfluity on one side of more than 1148 inches of print is to be subject to a stamp of one-halfpenny; and any transaction involving more than 3596 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, two- pence for 8 ounces, and then ascending by twopence for every 8 ounces contained in any quarter, and any number may be sent in one envelope open at the ends.

NEWT (Liatrispin punctatus). [SALAMANDRIE, p. 336.]

NEWTON. [Lancashire.]

NEWTON-ABBOT. [Devonshire.]

NEWTON-LIMAVADY. [Londonderry.]

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. lat., 6° 64' W. long., 12 miles E. from Belfast by the Belfast and County Down railway. The population in 1851 was 9567, besides 658 inmates of the workhouse. Newtownards Poor-Law Union comprises 16 electoral divisions, with an area of 302 square miles, and in 1851 of 56,561. The town, pleasantly situated in the midst of rich, fertile, and well-watered countries, and was 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, Primitive Methodists, and other denominations. 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 bridge, and a Union workhouse. The weaving and embroidery of muslin afford a considerable amount of employment, and petty sessions are held. Fairs are held on the second Saturday of every month, and on January 28th, May 14th, and September 23rd. Near the centre of the town is an octagonal structure, with canopied seat and pedestal of Portland stone, erected in 1636. Newtownards was incorporated by James II., and returned two members to the Irish Parliament.

NOAMI, LAKE. [AFRICA, 2.]

NIAGARA. [Canada, 2.]

NICEA (Nikèa), an ancient ruined city in Bithynia, in the north-west of Asia Minor, the site of which is marked by the Turkish village of Isî-kik. It stood on the eastern shore of the Lake Ascania, and was built or restored by Antigonus, son of Alexander the Great, and it was called Antigonea. The name was subsequently changed by Perdiccas, in honor of his wife, Nicaea, daughter of Polomenus, king of Egypt. The city became early the seat of a Christian bishop. It was destroyed by an earthquake in the latter end of 4 a.d. 255, but it was soon repaired, and the emperor Theodosius II., by the Greek Nicephorus Melissenus, the Turks, under Sokman I., took the city (1080), which was made their headquarters till 1097, when Godefroi de Bouillon, 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 1261, when in the reign of Michael VIII., the Turks conquered the city (1261), and 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, 1409) it was taken and pillaged by the followers of Tamerlane. In 1443 it joined in a conspiracy to put Mustapha on the throne of his brother, Amurath II., whereupon the latter reduced the city to obscurity, and had his brother and the chief conspirators strangled in his house.

Sir Charles Fellowes, 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 masonry of great height, from an ancient temple; another part is built with Roman brick. The brick, of late 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 cyclopean style. 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 Fellowes' 'Asia Minor.' Among the ancient has been the temple of Apollo, the temples of the Dioscuri, and the statues; and ruins of an early Greek theatre, 'of 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 of this great plain. The ancient has disappeared, and the village of Isî-kik, which stands in the centre of the ruins, 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 neighbourhood is a fragment of good sculpture are built into the houses. A Roman aqueduct still conveys water to the town from the neighbouring 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 Nicaea is memorable as the place in which the first and seventh ecumenical or general councils were held. The first, held in 325 (June 19 to August 25), in presence of the emperor Constantine and presided over by Osiris, 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 second council, held by Osiris, is that the Nicene Nicenum, that is, Nicene or Nicene Creed, still in use. This council also passed decrees for celebrating the festival of Easter on the same day throughout Christendom. The seventh council was held in 778 (September 24 to October 23) and signed by 377 bishops, condemned the Iconoclasts, and explained the worship of images.

(Fellowes, Asia Minor; Art de Versar les Dates.)

NICARAGUA, Republic of, of Central America, occupies the high mountains on both sides of the oceanic basin of the Bay of Conchagua on the Pacific, and back to the Mosquito territory. 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, of the republic does not probably exceed 35,000 square miles, but that claimed is of course much greater. The population may be about 300,000, the chief part of whom are ladinos, or mixed Indians and Spaniards.

The coast along the Pacific 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 now just be regarded as the most important, from its being the Pacific port for the Nicaragua route connecting the Atlantic and Pacific Ocean, is San Juan del Sur, north of Salinas Bay, which is formed by two promontories between 400 and 600 feet high, having an entrance above 14° 30' N. lat., 86° 20' W. long., and is sheltered, and affords anchorage in from 2 to 10 fathoms water. About a mile from it is the nearly similar harbour of Nacacolo. 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 republic. There is a very narrow tract of tolerably level land along a good part of the coast.

Along the northern coast of the republic, at a few miles from the coast, extends a ridge of low volcanic mountains, highest at 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. The climate of the republic is unhealthy, and not much there is scarce any connection with the main ridge, though continuing in its general line of direction. The highest summits appear to be Omotepac, which forms an island in Lake Nicaragua (5100 feet above the sea); Memomoteb, at the northern
extremity of Lake Managua, about the same height; Mombo, between Lake Nicaragua and the Pacific (4500 feet); Nindiri, between Managua and Masaya; Feliz; El Viejo, and one or two others. Several of these are active volcanoes.

Another mountain tract, the Sierra Leon, in northwest 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 the basins of the rivers San Juan,遮和Granada.

The remainder of the state 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; the tract of which communication occupies a large part of the Nicaragua section of it, being only 122 feet 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 short 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 Escondite; the sources of another, the Segovia, rise on the Gulf of Fonseca, the outlets of which 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.

The rivers Rio San Juan, 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 Laguna of Nicaragua is an inland sea, of a long and narrow form, being about 100 miles long and 40 miles 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 10 fathoms of water along the southern and western banks.

It is only very shallow along the north-east shore for a mile and upwards into the lake. It contains several islands, notably Monaguel. One of the three main western bank between Granada and Nicaragua, is remarkable for a high volcano, and for its fertility and population being inhabited by a numerous and industrious tribe of Indians, who have a small town, Moyapalpa, possess cattle, and are exempt in every respect from the Royal and other taxes; 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 Serapiqui. About 25 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 is considerable; the banks, even at low water, being nearly shelving; but as the river is 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 over 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 narrowest part the distance between the coast is only 15 miles, and the gulph is less than 10 miles, but the hills upon it rise to between 400 and 500 feet, presenting a formidable barrier to the construction of a canal, while the difference of level between the lake and the sea is 162 feet. The waters of the lake would be well suited to convey the passengers and goods from Nicaragua to San Juan del Sur on the Pacific. During 1854 a very large number of passengers and goods came 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 13 miles of land carriage over a good macadamised road." Before the establishment of this route communication had been maintained between the Atlantic and the towns of Granada and Nicaragua, by the river San Juan and Lake Nicaragua, by means of flat-bottomed vessels called piraguas, of from 5 to 10 tons burden. The passage from Granada to San Juan del Sur by means of piraguas costs 10 dollars. The piragua in about 8 days, whilst the return passage being against the stream, occupies from 12 to 15 days. It has been proposed by some as more advantageous to unite the Lake of Nicaragua with the Pacific, by means of a small canal from Granada to 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 30 miles long, and fifteen miles broad in its widest part. It is deep enough for vessels of 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 sand bars. 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 care of disease. The thickly wooded banks of the San Juan River are no exception to this observation. The shores of the Pacific, where the population is densest, are also very hot and somewhat humid, but do not appear to be particularly unhealthy, and in the drier northern and southern districts there is no such difference. In 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.

The hilly districts of the country 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.
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 alga and aquatic plants are common. Along the coast pearls used to be found. 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 manufactures 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 purplish colour, obtained from a shell-fish caught in the rivers. The Indians, in great request among the Indians, who prefer it to 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 a loose approximation:—

Leon, the capital of Nicaragua, contained not many years ago, a population of 32,000 inhabitants, but the civil contests within the town have reduced it to half that number, and its present position, we are informed, is situated on a road which leads from the best-cultivated districts of the state to the harbour of Realajo, in 12° 26' N. lat., 86° 22' W. long. The city occupies a considerable area, and contains a cathedral, several churches, a university, Tribunal, alcaiceria, etc., in a very healthy situation.

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 Indian, who is 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 caoca and grapes.

San Juan del Sur, on the Pacific, S.W. of the town of Nicaragua, has a few inhabitants, and is considered as a port or a selection as the Pacific port for the Nicaragua line of communication between the two oceans. The harbour, as already mentioned, is small but convenient, and possesses good anchorage.

Segovia, 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 1828 of the republic of Central America [Granados, 1. 107. S. 3.], 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.

NICOLAS I., PAVLOVICH, Emperor of Russia (styled also Czar and Autocrat of all the Russians), was born in the city of Petersbourg, July 7, 1796 (June 25, Old Style). He was the third son of the late Emperor Paul I., having been the first son, and the Grand Duke Constantine the second son. His mother, Sophie Dorothea, a daughter of Friedrich Eugen, duke of Würtemberg, when she became the second Empress of Russia, became also a member of the Greek Church, and, as is the usage, changed her name to that of Maria Fedorowna.

The Emperor Paul having been assassinated March 23, 1801, Nicolas was left entirely to the care of his mother, who appointed General Jemader his governor, and selected the Countess Liven 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 a knowledge of the French and German languages with as much facility as the Russian, and early manifested that preference for military display, military tactics, and the art of fortification, which distinguished him through life.

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 Netherlands, Belgium, France, Germany, and Italy. In 1817, he married Frederica-Louisa-Charlotte-Wilhelmina, eldest daughter of Frederic William III., king of Prussia, and sister of Frederic William IV., the present king. She was born July 13, 1796, and her distinguishing name was Charlotte, but on her marriage and entering the Church she assumed the names of Alexandra Feodorowna.

The Emperor Alexander I. having no issue, his next brother Constantine was the legitimate heir to the throne; but, by a document signed August 25, 1826, Constantine renounced his rights, giving to himself the dignity of Viceroy of Poland; so that, when Alexander died at Taganrog, December 1, 1825, Nicolas immediately succeeded him. He did not however become emperor without a struggle attended with much anxiety and bloodshed. The prince had not yet organised 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 with the destruction of the revolutionary principles of France could be achieved 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 ceremony was about to commence, stepping forward out of the ranks, denounced Nicolas as a usurper, and proclaimed Constantine as their rightful czar. The soldiers followed their officers, with cries of "Constantine and the Constitution!" Milardo, with the governor of St. Petersburg, a veteran follower of Nicolas, the army, and the archbishop, in his ecclesiastical robes, endeavoured to suppress the hostile demonstration, but in vain, and the people showed signs of sympathising with the troops. At this critical moment Nicolas called out, 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 countenance, and the reverence with which the Russians gazed upon him, produced a powerful effect upon the soldiers to kneel and ground their arms. The first outbreak was thus checked, but the conspiracy was not suppressed till artillery and musketry had poured freely their missiles of destruction among the gathering masses of the insurgents; and though the officers and other leaders of the conspiracy were executed. Others were sent to the mines of Siberia, where Nicolas continued their punishments with unanswerable severity. He was crowned at Moscow with great pomp and ceremony, September 3, 1826; and at Warsaw, May 24, 1829.

Soon after his coronation, in 1826, the Emperor Nicholas commenced a war with the Shah of Persia, which lasted till the victory over the Persians by Field-Marshal Paskevich, in which the Emperor was victorious, and which the Shah, besides undertaking to pay about three millions sterling, ceded to Russia the provinces of Erivan and the countries situated on the lower Kour and the Aras. This war between Russia and Turkey ensued in 1828, during which the power of speaking the Turks, which the Shah, besides undertaking to pay about three millions sterling, ceded to Russia the provinces of Erivan and the countries situated on the lower Kour and the Aras. In the campaign of 1828, General Diebich took the fortress of Silistria, defeated the main army of the Turks at Shumls, crossed the Balkan, and forced the surrender of the other Turkish forces. The war between Russia and Turkey ensued in 1828, during which the power of speaking the Turks, which the Shah, besides undertaking to pay about three millions sterling, ceded to Russia the provinces of Erivan and the countries situated on the lower Kour and the Aras.

On the 29th of November 1830 an insurrection broke out in Poland. The Polish troops having joined the insurrec-
tionists, the Grand-Duke Constantine, as commander-in-chief, was allowed to retire from Poland with 8000 Russians. In January 1831 the Polish Diet declared the throne vacant, organised a national government under Prince Adam Car
tory, but the Russian administration was more efficient.

They assembled about 60,000 troops; but the Russian armies which advanced against them numbered about 130,000, and had about 400 pieces of artillery. The Poles fought bravely, and were successful in several actions, but sustained an enormous loss at the battle of Ostrolenka, May 26, 1831. The Prussian government prevented the Poles getting supplies of arms and ammunition across their frontier, while the Russians were allowed to have magazines within the Prussian territory. Drouot, the potent minister of foreign affairs, died in June, and was succeeded by Paskevich. Warsaw was besieged on the 6th of September, and surrendered on the 8th. The failure of this insurrection was disastrous to the Poles. The Emperor Nicolas treated them with rigorous severity: several were sent to the mines of Siberia, and many to serve as soldiers in the Caucasus; the Polish constitua
tion was formally abrogated; the chief universities were suppressed, and the libraries removed to St. Petersburg; and on the 17th of March, 1832, by a decree of the emperor, the kingdom of Poland was incorporated with the Russian empire.

In 1837 the Emperor Nicholas made a tour in his Trans
casussian provinces. He travelled with great rapidity, but reviewed the troops, gave dinners and a grand ball, and held a levee, which was attended by all persons of distinction in the provinces. He paid a visit of inspection to the fortress of Gummi, since named Alexandropol, near the frontier of Turkestan and Persia, and the same evening he reviewed the troops. It was then in process of construction, and is now a fortified position of great strength either for defence or offence against the Turks in Asia Minor. A desultory conflict was at this period carried on between the Russians and the Circassians, but in 1839 war was formally declared by Russia against the Circassians, and has continued with little intermission ever since. In 1844 the Emperor Nicholas paid a second visit to England, and was entertained by Queen Victoria at Buck
ingham Palace and Windsor Castle from the 6th 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 disas
trous war in which he had engaged, and the reverses his army experienced probably occasioned a degree of excite
ment which contributed to its being the commencement of the period of the empress's ascendency, which is believed to have been the minister's menzinkoff in March 1833 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 was sent to Constantinople as a 'martial guarantee' for enforcing it. In October of the same year the Porte declared war against Russia, and applied to France and England for their promised aid. A Turkish army under Omar Pasha occupied Skhuli and the fortresses on the Danube; in November he threw a body of troops across the river opposite Wida, and fortified a position at Oltenita, 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 a Russian army under Bagration into the Black Sea.

The English and French armies were next landed and encamped near Constantiopolit, whence they removed to the vicinity of Varna. In March 1854 the Russian army crossed the Danube, and besieged the fortress of Silistria, but after great efforts and an enormous loss of men was compelled to raise the siege on the 18th 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 flanking movement won the battle of theerek in the Black Sea; and commenced the siege, which, after a severe struggle, the facts of which are well known, was terminated on the 8th and 9th of September 1855, by the capture of the town and the forts on the southern side of the harbour of Sebastopol.

Meantime, before this great feat had been accomplished, the Emperor Nicholas 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 he has left issue four sons and two daughters: Alexander, born April 29, 1816; Maria, born August 18, 1819; Olga, born September 11, 1822; Constantine, born September 21, 1827; Nicolas, born August 8, 1851; and Michael, born October 29, 1835.

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 inde
temperately industrious. He had a taste for the fine arts, and was a connoisseur of music, and a patron of the arts, but his favourite pursuits were connected with the military sciences and military operations. In his political principles he was proselytically despotick. He has been heard to say, 'Despotism is the glory of my government, and it suits the genius of my land.' The great objects 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 Constantiopolit. 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 Europe and Asia.

Nicolás, Sir Nicholas, was born on March 10, 1799, the fourth son of John Harris of Cornwall. He entered the navy early, and attained the rank of lieutenant on September 15, 1815, after having distin


cuished himself in the Trafalgar action, where he served in the Vanguard. As a child he was 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," published in 1825. He published a second book, "Memoirs of a Servant in the House of Lords," in 1829. He was also the author of "Tours in France and Germany," "Tours in the Levant," and "Tours in Spain," and was the editor of "The Life of Francis Davison," reprinted from the edition of 1608: 'The Lite

rary Remains of Lady Jane Grey'; 'Journal of the Embassy of Thomas Beckington to France in 1442'; 'The Siege of Carlowayck'; 'The History of the Battle of Agincourt'; 'Memoirs of the Civil and Military History of Portugal,' published in 1823; 'A Chronicle of London from 1088 to 1483,' from manuscripts in the British Museum; 'Memoir of Lady Fanshaw, written by herself'; and 'Memoirs of the Reign of Henry VIII.' The works which are thus mentioned, with annotations and other matters, as to be assumed the character of original works, are all highly valuable to the historical student. In 1896 he became joint

curator with Henry Southern of the new series of the "Retro

spective Review," of which only six numbers were published.

Among his most generally useful historical works are: 'Nottis Historica, containing Tables, Calendars, and Mis

cellaneous Information for the use of Historians, Antiquaries, and the Literary public', published in 1812; and for 'Lardner's Cabinet Cyclopedia,' under the title of 'The Chronology of History; containing Tables, Calculations, and Statements indispensable for ascertaining the Dates of His
torical Events, and of Public and Private Documents, from the earliest period to the present time,' 1855, a most valu
able work, which has been more than once reprinted. In his "Controversy between Sir Robert Grosvenor and Sir Richard Scrope in the Courts of Chivalry, a.d. 1366-1368," a magnifi
cent work of 1819, in four volumes, 8vo, he gives a clear and un
concealed history of the controversy, and his work was used as the basis of a large number of other works. He also published "The Lives of the Earl of Surrey, Sir Thomas Wyatt, Collins, Cowper, Thomson, Burns, and Henry Kirke White." In 1844 he published "The Despatches and Letters of Admiral Lord Viscount Nelson," in 7 vols. 8vo. He had also com
menced "The History of the British Navy," of which only 3 N
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 Guelphic Order, and in 1832 chancellor of the Ionian Order of St. Michael and St. George. After a life of industrious research in his profession, and in every one of which has great historical or professional merit, he died at Cape Coré, near Boulogne, on August 3, 1848.

NICOPOLI, NICOPOL, in Turkish 'Fethiyan-Kale', the ancient Nicopolis ad Istrum, a city in Bulgaria, in Europe, on the right bank of the Danube, 80 miles S.W. from Bukharest, 250 miles N.W. from Constantinople, and has about 10,000 inhabitants. The Osa on the Bulgarian side, and the Aluta or Cuma on the Greek side, is the chief town on this shore of the city. The city, which occupies one of the finest sites in the world, consists of two parts. The fortress and Musulman town, crowned by many shining minarets, stand on the summit of a lofty limestone cliff above the Danube, several hundred feet high, and surrounded by a ravine. It is a place however of little real importance as a fortress, for it is commanded by heights around it. On the opposite or eastern slope the houses of Bulgarians, Wallachs, and Jews rise in white clusters one above another like an amphitheatre. The Turch town is defended on every side by batteries and by a stout parapet rampart, for the protection of infantry; it is further defended by a castle or citadel. There are some large well-built houses, several mosques and baths, but in general the town is very poor. The new city of Nicopolis, especially on the eastern side, towards Sistova, is very beautiful; much of the ground around the town is laid out in gardens. Nicopolis gives title to a Greek archbishop and a Catholic bishop. Its situation on the Danube makes it a place of some trade.

Nicopol was founded by Trajan. Several patches of the ancient walls still remain. The sultan, Bajazet I., at the head of the Janissaries, defeated the Hungarians, commanded by their king Sigismund, and sided by the chosen troops in Europe, under the walls of Nicopol, Sept. 28, 1396. Sigismund had besieged the town for six days before the arrival of the Turks. The town has often suffered from the Romanians.

PULULARIISEAE, a sub-order of Plants belonging to the order Gasteromecetes, the alliance Phanaglae, and the class Thalagonia. It includes the genera Nicularia, Cynthus, Cuculba, Spharabolus, Thelebus, and Alatobulus.

NINEVEH. [NINAVUS, S. 1.] Since M. Bottet's first discoveries were made known to Europe still greater additions to our knowledge of Nineveh have been made by Dr. Layard, who spent much time in making excavations in the great inclosure near the Tigris, before mentioned. Here, in the course of his discoveries, he has unearthed the papers of the great Assyrian monarchs; brought to light those colossal human-headed bulls, the kings, warriors, priests, and winged messengers, which form subjects of astonishment to visitors of the site. The great destroyers of Nineveh had beforehand eyes to read from long cuneiform inscriptions the pompous but inoffensive catalogue of Assyrian triumphs in war or in architecture. In a word, the discoveries of Dr. Layard have shed light upon one of the darkest periods of history, and laid bare before us the life, arts, and manners of a people of whom previously little more was known than the name. Colonel Rawlinson, Dr. Edward Hincks, and other distinguished British and Continental scholars have made great progress in deciphering cuneiform inscriptions.

NIQUBAI [ONIQUE, S. 1.]

NISI PRIUS. The nisi prius clause which gave rise to the use of this phrase in reference to the various matters mentioned under Nisi Prius, p. 341 no longer exists, the writ of certiorari which was formerly issued in every case having been abolished by the Common Law Procedure Act 1832. That statute has substituted for the ancient jury process a precept to be directed by the judges to the sheriff previous to the action, commanding him generally to summon a sufficient number of the parties, effecting in this way a considerable saving to the plaintiff.

NISI, or NISCH, a town in European Turkey, the residence of a pasha, is situated in a fine open plain on the Nissia, or Kizil Chu, a tributary of the Eurymedon, 60 miles S.S.W. from Widden, and contains about 10,000 inhabitants (4000 Mohammedans and 6000 Christians). Nissa occupies the site of Naisos, the birthplace of Constantine the Great; but nothing remains of its ancient glory.

The town is modern, and by no means remarkable for its beauty. The principal building is the Konak, or palace of the pasha. The defences works round the Turkish quarter on the right bank of the river, consist of well-built ramparts of great extent, with wattled parapets and a dry ditch. The town is defended by a citadel and a strong fort on the opposite shore of the river. It is surrounded by a trench and palisades. The Christian quarter, which is the largest part of the town, lies beyond theazaar, and is open to the plain. Nissa is now the chief town of the pashalik of Sophia; it is called Nisch by the Turks. It is the residence of a pasha and capital of a large pashalik of Western Asia Minor. As it is 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 the town there is also a gunpowder magazine and workshops. The Lowicz and the little Balkan, two ramifications of the Tesvich, and the little Balkan, two ramifications of the Hamsus, 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 1389, 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. Very few skulls now remain. The Christians 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, and has a small wicket-window in the side wall.

The interior is said to be a favourite retreat of snakes and lizards. The Austrians took Nissa in 1737.

NOCTIULCA, a genus of Animals usually referred to the class Acoelophaga, [Acolephae]. One species only of this genus is known, N. serbica, which is found in prodigious numbers along the coasts of England, and is the most frequent cause in this part of the world of the phosphorescence of the ocean. It was first discovered by M. Surinam in 1810.

According to M. Suriray the Noctiulca is a spherical gelatinous mass, provided with a long filiform tentacle or appendage, presenting a mouth, an oesophagus, one or many stomas and ramified ovaries, and thus possessing a certain complexity of organisation. De Blainville confirmed Suriray's account, and placed Noctiulca, without doubt most erroneously, among the Diphyela. On the other hand, Van Beneden Verhaeghe and Doyers deny the relation of Noctiluca with the Acoelophaga—and conceiving 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 la Céphalopode noctiluque', a letter published in the 'Journal of the Royal Society of Nat.' 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 sea anemone, Cerebella. Kroneb was the first to describe the organ from which proceeds from the mouth of Noctiulca. Mr. Huxley has recently described this animal in the ' Quarterly Journal of Microscopical Science.' (Vol. iii.) He says—

"Noctiluca millitaria may be best described as a gelatinous transparent body, about 160th of an inch in diameter, and having very nearly the form of a peach—that is to say, one surface is a little excavated, and a groove or depression runs from one side of the excavation half way to the other pole of the body. (Fig. 1.) This is var. transversa, net. (Francois.)—From the body is drawn off the slender organ, the "Krohn. Where the stalk of the peach might be, is a filiform tentacle, equal in length to about the diameter of the body, and depending from it, and exhibits slow wavy motions when the creature is in full activity. I have even seen Noctiulca appear to push repeatedly against obstacles with 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 gelatinous mass, to which the granules are attached; through this mass the granules are scattered without any very definite arrangement. From hence arises a network of very delicate fibres, whose meshes are not more than 1-8000th of an inch in diameter, and which extend throughout the mass, becoming more and more open—into coarser fibres, which take a convergent direction towards the stomach and nucleus. All these fibres and fibres are covered with minute granules, which are usually larger towards the centre."
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
Reed’s Acts and Laws, 1852.)

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 non-suit by order of the Court in exercising their discretion.

NORTH AUSTRALIA is at present the designation ap-
plied to that part of Australia, comprising consider-
yably more than one-half of the island, which lies north of the parallel of 28° S. lat. This parallel forms the northern boundary-line
of the territory known as New South Wales, and the south
boundary of Western Australia remaining unsettled. Coburg Pen-
ninsula projects west-north-west from the mainland, between
Mount Norris Bay on the north-east and Van Diemen’s Gulf
on the south-east, a distance of about 60 miles. The greatest breadth of the peninsula is 15 miles, and it narrows progressively to the west and south-west, where it joins the mainland by a neck of land about 5 miles in length, and is 34 miles wide. On the north side of Coburg Peninsula is the deep inlet named Port Essington, which lies between 11° 43’ and 13° 50’ S. lat., 132° 8’ and 133° 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 depth is 25 fathoms. Between 5 and 12 fathoms from the entrance, and at the southern end it forms a large safe harbour, 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
usually entered by large vessels, and are the centre of 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 mon-
soon it is accessible to the Malay and Bengal trading prose,
and to the junks from China.

The soil of the peninsula is in general indifferrent, but in
many places it is good, principally on the low flats and hol-
lows, and near tracts which are swampy in wet weather.
The vegetation is only tropical, but during the dry season.
The north-west monsoon, which brings the rainy
season, begins about November. The rain during this mon-
soon falls in torrents, but seldom continues above two or
two hours at a time. The general range of the thermo-
meter at this season is from 75° to 95°, the midday heat being no lesser than the whole year is 63°, or
about that of the equator.

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 of the sable trade, and with a view of the exchange of
Indian commodities, a settlement was made in 1834 in
Apesley Strait, and called Fort Dandars, and another in 1837
on the Coburg Peninsula, and called Fort Wellington, but
both settlements were abandoned in 1838. In 1839 another
attempt was made, and the town of Victoria was founded
on the western shores of Port Essington. In 1846 the popula-
tion was stated to be about 60. The Malays did not settle
there, as was expected: the climate is unsuitable to Eu-
ropians, and the settlement has been abandoned.

The coasts, inlets, and islands of North Australia have
been surveyed and named, but of the interior hardly anything
is yet known. Melville Island, on the northern coast,
between 11° and 12° S. lat., 130° 20’ and 131° 34’ E. long.,
is one of the largest of the islands. The area is 1,400 square
miles. It is separated from Bathurst Island, which lies
west of it, by Apesley Strait, which is from 2 to 4 miles
wide and 46 miles long. From Coburg Peninsula it is sepa-
rated by Dandars Strait, which is 15 miles wide. The natives
lead a wandering life, living in the dry season on kangaroos
and other marsupial animals, and during the wet season on
fish, turtles, crabs, and other shell-fish. Their vegetables are
the cabbage palm and the sago-palm.

NORTH LEAVE HAVEN [SIMPSON R.]

NORTH-WEST PASSAGE. In the article North-West
Passage an account is given of the series of voyages under-
taken for the discovery of a passage westwards from the
Atlantic Ocean into the Pacific Ocean, through the
ship’s company, and around the North Pole, and the
passage is there brought down to the year 1838. We now add an account of

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After describing minutely the structure of this creature, Mr. Huxley concludes—

"I have observed lead me to believe that
Nootillus has a definite alimentary cavity, but I am in-
clined to think that this cavity has an excreterary aperture
distinct from the mouth. The funnel-shaped depression in
the post-oral area in fact always appeared, when I could ob-
tain a view of it, as a circular eminence on the anterior aspect 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 escut was voided "in the form of the colony, but 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, and my belief in the existence of the distinct anus is
found simply on the structural appearances.

"In front of and above the gastric cavity is the nucleus,
described by Verhoeffe and Krohn. This is a strongly
refracting oral 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 fibers pass from
it; the posterior from the alimentary canal.

Quaratges and Krohn consider that a process of
fission of the mouth is the birth of Nootillus also; both of
these observers having found double individual bodies.

On the contrary, in the 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 indica-
tions which I have noticed of the process are a certain
appearance 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 is what repeated examinations lead me to believe
is the structure of Nootillus; but if the preceding account
be correct, it is obvious that the animal is no Rhizopod, but
must be promoted from the lowest ranks of the Protosor to
the highest.

"The presence of a dental armature, and of a distinct
anterior aperture, are structural peculiarities which greatly in-
crease the affinity to such forms as Colpoda and Para-
macum, indicated by Krohn. Nootillus must be regarded
as a gigantic Infusoriam with the grooved body of Colpoda,
the long process of Trachelas, and the dentinal armature of
Nasutha 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
consideration 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. Lycidae, and within this family, in the sub-
family Nolaneace. A natural order of Plants, having erect
or prostrate stems; alternate leaves without stipules. Flowers
usually showy; calyx 5-parted, valvate in maturation: corolla
monopetalous, with a pistil-like ovary thickened in the
styles; stamens 6, 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 nectaries, with a single style seated on a succulent disc;
 stigma somewhat capitate. Fruit inclosed in the permanent
caixy, 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 but 6, and they are distinct; in another
there are 90 combined in fours, in which the combination is
irregular though the number remains 20, and in others they
are all wholly distinct. The species are all South American,
and chiefly from Chili. Their uses are unknown. There are
6 genera and 11 species.

NONSUIT. The statute establishing the County Courts,
9 & 10 Vict., c. 93, 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 nonsuit in a case of a non-suit. The practice of giving
judgment in the Supreme Courts, as
the subsequent voyages of exploration, and also of the expeditions sent out in search of Sir John Franklin and his associates.

In the year 1845 the British government sent out another expedition to the Arctic Seas for the purpose of discovering the North-West Passage, under the command of Sir John Franklin. They sailed from the Thames on the 23rd of May, and on the 25th of July were spoken by the Prince of Wales whaler at the entrance of Lancaster Sound. In consequence of the ships not having been afterwards seen or heard of, 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. lat., 90° 12' 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 his 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 1850. Captain McClure was appointed to the command of the Enterprise, and Captain Clavering to that of the Investigator. The two ships left the Thames January 10, 1850, and sailed in company round Cape Horn, where they encountered first Barrow, and then north-eastern extremity of Behring's Strait, August 5, 1850, and then bore to the east, just keeping clear of the American coast. Captain Clavering having failed to force his way through the pack-ice of Behring's Strait, sailed for Hong Kong, where he wintered. Captain McClure reached Cape Parry on the 6th of September. From this point high land was observed to the east-north-east, and named Baring Island, and two days afterwards, still farther to the east-north-east, more land was observed, and named Prince Albert Land. This land is continuous with Victoria Land and Victoria Island, and extends northward to 72° 21' N. lat. The Investigator was then navigated northward through a channel which separates Baring Island from Prince Albert Land, and which Captain McClure 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 through the winter. Parties were sent out by the strait, and discovered a portion of 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 encircling ice and steamed southward. The Prince of Wales' Strait into Barrow Strait, but on the 10th 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 McClure, 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, they ultimately have been enabled 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 McClure named Mercy Bay, September 4, 1851. This station is on the northern side of Baring Island, in 74° 6' N. lat., 117° 54' 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, the whole voyage into Baffin's Bay might have been easily accomplished, but as it was the great- gator 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.

Melville Island is distant about 60 miles N. from Mercy Bay, and in April 1853 Captain McClure 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 McClure had made arrangements for deserting his frozen-up ship, the document was discovered by Captain Kellett's officers, and Lieut. Pim, with a party of boats carrying provisions, were sent out to Melville Island, to Mercy Bay, and equipped with all necessary things. Captain McClure and his crew, the excitement of the meeting may be easily imagined. Captain McClure remained with his ship till the spring of 1854, when he and his crew were brought back to England by the ships belonging to Sir Edward Belcher and his company. 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 course of Captain McClure's voyage of 1850, and discovered a strait between Herschel and Prince of Wales' coast, whence he also was obliged to return. He wintered in 1851-2 in 71° 35' N. lat., 117° 35' W. long. The winter of 1852-3 was passed in Cambridge Bay, Wollaston Land, 69° N. lat., 103° 30' W. long. Still struggling on, the winter of 1853-4 found the Enterprise in 70° 8' N. lat., 145° 30' W. long. On the 15th of July, 1854, the Enterprise was released from the ice, when Collinson commenced his return voyage. He reached Point Barrow on the 9th of August, and Point Clarence on the 1st.

These expeditions may be more briefly noticed. In 1850 Captain Kellett 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 sent out under the command of Lieutenant William Dampier, and discovered a channel between Herschel Island and Victoria Island, and named the channel Dampier Strait, and placed under the command of Lieutenant de Haven. In August, 1850, Captain Ommanney and Captain Penny conducted travelling parties by order of Captain Austin, who commanded an expedition sent out by the British government, in the British seas. Captain Frank discovered that Sir John Franklin's expedition had passed the winter of 1854-5 at the mouth of the Wellington Channel, in a bay between Cape Riley and Beechy Island. Captain Penny also explored the Wellington Channel to a distance of 60 miles from the mouth, and discovered a strait between Herschel Island and Victoria Island, named after Captain Penny. In May, 1851, the Prince Albert, a small vessel, was equipped at the expense of Lord Stanley, and under the command of Mr. William Kennedy. The Prince Albert passed through Lancaster Sound, and wintered in Batty Bay in Regent's Inlet, on the east side of North Somerset. In March, 1852, Mr. Kennedy, with Mr. Ballot, an enterprising young French sailor, and a party of Kamichelle Indians, explored the Wellington Channel to a distance of 60 miles from the mouth, and discovered a strait between Herschel Island and Victoria Island, named after Captain Penny. They thus discovered a third North-West Passage, and proved that North Somerset is a large island, separated from Boothia Felix by the Brentford channel, which they named Ballot Strait, and found to be 15 miles long and 2 miles wide. They next travelled over the ice of Victoria Strait, then over Prince of Wales' Land due west as far as 100° W. long., then northward to the south-east angle of Ommannaney Bay, then eastward to Brown's Bay in Peel Sound, whence following the coast-line northward they arrived at Cape Walker, where the Prince Albert had wintered in 1850. May 30th, after an absence of 96 days, and having travelled on foot and with sledges 1100 miles.

Captain Inglefield, in the small screw-steam-ship Isabella, sailed from the Thames July 31, 1852. He proceeded along the east side of Baffin's Bay, and entering Whaleb Sound 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° 30' N. lat., 101° 30' W. long. The north coast there suddenly tending to the south, and the sound being of such a nature as to point its direction westward as far as the eye could reach. The Isabella 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 exploration with boats and sledges led to the discovery of various countries and lands. The west side of Western Greenland 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., named for a French fishing boat, was seen by Sir E. Belcher in 1850, and the Pilot of the Belcher, from which the name is derived, was blown from the bow of a whaler on a desolate island. 

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 watchs, silver spoons, telescopes, and other things which belonged to the officers and seamen of the Erebus and Terror. These he purchased for 100 dollars. But it is stated by some that the Esquimaux had informed him, that in the spring of 1850 about forty of the ships' crews were seen (not by Dr. Rae's informants) near the north shore of King William's Land, that the men were well clad, and had procured worn and emaciated, and had purchased a seal of the natives. The two expeditions which it was stated the Admiralty intended to send out in November 1854 were not sent. Lady Franklin, however, chiefly on her own expense, sent out an expedition in the Pery, under the command of Captain M'Clintock, 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—was, that there was very little prospect of any of them being able to reach the Pacific Ocean, which the Antarctic Ocean be Mary be entered by the Atlantic, or the Atlantic Ocean from the Pacific, by which, the west coast of Barings Island, by the east coast of the same island, by Prince of Wales Strait, by Regent's Inlet by Bellot Strait into Victoria Strait, and probably also by Peel Strait into Victoria Strait. These passes, 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, but the 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 ascended that there are three large islands in the Arctic latitudes, Dr. Rae, and Captain M'Cure, that Wollaston Land and Victoria Land are continuous, forming the south coast of the largest of all the islands of the Arctic Seas, 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 Omnmanney Bay and Osborne Bay, so named from the explorers. North Somerset was 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 1891, Captain M'Cure says, "On the 1st of April we had 1000 lbs. of venison hanging at the yard-arms;" and in 1893, he says, "A supply of game has been kept up during the winter, which has enabled us to issue a meal 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, compared with the North Atlantic, which was seen by Dr. Kane as well as by Captain Inglefield.

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. It is a small tract of land on the west side of the Drachenberg Mountains, between the two great branches of the Orange River, the Ky Gareep and the Nu

Gareep, comprising a triangular area of about 50,000 square miles.

The Drachenberg Mountains, called also the Quatlaumba 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 8000 feet, which towards peaks, and rocky ridges, intercepted only by ravines and canals, and thus forming a barrier between Kaffiria and Natal on the east, and the Northern Sovereignty on the west. A secondary range, called the natives Malati, or the Peaks, runs parallel to the Drachenberg Mountains, and is intersected by ravines, and rocky ridges, and is thus forming an other barrier to the Malay, and the Northern Sovereignty on the west. A secondary range, called the natives Malati, or the Peaks, runs parallel to the Drachenberg Mountains, and is intersected by ravines, and rocky ridges, and is thus forming an}

The country immediately west of the mountain ranges is from 600 to 900 feet above the level of the sea, and consists of a series of wide plateaus, which, sloping gradually downwards towards the lower course of the Vaal River, terminates in plains of vast extent, sometimes containing numerous isolated and rocky hills, but generally quite flat and without trees. These vast wastes 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 Kafiria, or into the Vaal. The Vaal River rises between 26° 27' S. lat. 29° and 30° E. long., about 500 miles W. from Delagoa Bay, in an interior range of mountains bounding the great plains of the north, and flows south-west, then west, and afterwards north-west, till it joins the Ky Gareep. Its principal affluent from the north is the Caledon; from the south it receives the Stormberg River, the Orolgo, the Zeekoe Rivers, and other less of importance.

This portion of the continent, being remote from the sea-coast, receives its rain in thunder-storms, chiefly during the summer months, December and January, are the hottest; and there being no rain during the middle of the year, the climate and soil are then characterised 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. eurhoch), 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 the plain. The spring-bok is a large antelope, its horns are less numerous, and with buffaloes. Hyaenas are abundant. Lions are very common. The hippopotamus is very common in the larger rivers. Ostriches appear on the great plains, and in the mountains, and in the isolated hills of the interior. The Giqua, 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 Na Gareep and of the Kafiria.

The colony has been distributed into four districts—Bloomfontein, Caledon River, Winburg, and Vaal River. The principal town is Bloomfontein; situated in 29° 8' S. lat., 26° E. long., on the high road from the Cape Colony to Natal. It is about 360 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 inconsiderable places. There are three or four mission-stations belonging to the British, French, and Prussians.

The country appears to be well adapted for sheep pasturage and the production of wool. The climate seems to have a favourable influence on the fineness of the fleece. Small quantities of merino wool have been found in the neighborhood of Smithfield.

When the Dutch inhabitants of the Cape Colony emigrated
from in 1836 and following years, they settled themselves at first in various parts of the territory which is now named the Northern Sovereignty. In 1886 a party of them went to Natief, where they were treacherously murdered by the warriors of the chief Dingan. [Nata, S. 2.] When the Dutch, who had conquered the natives and declared a republic, were obliged in their turn to submit to the English in 1849, 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 1846, Sir Harry Smith, with the assent of the well-affected boers, erected the whole of the territory inclosed by the Ky Garoop and the Nu Garoop into a British colony. This led to another contest, in which Sir Harry Smith defeated Pretorius and his adherents on the 29th of August, 1846. Pretorius fled beyond the Vaal River, and the majority of the boers laid down their arms and submitted to the British government.

NORWOOD. [SARRT.] 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 bulbs 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 external surfaces of that bone and the turbinated 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 odoriferous 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 turbinated 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 carnivora, 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 compound 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 Insects belonging to the family Hydrocoris, of the order Hemiptera. N. glanca, 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.

NUNEADES. [WALES.] NUSSEIRITE. [MINERALOGY, S. 1.]

NUTRIMENT, NUTRITION. [Food, S. 2; Trees, Organic, S. 1.]

NYCTAGINACEÆ, a small natural order of Hypogynous Exogenous Plants, belonging to Lindley's Cheenpodal 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 arculate at the umid nodes. Mirabilis 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. [CONVOLVULACEÆ.] 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 Polygomesæ, Amarantheæ, and Cannabinaeæ. It contains 14 genera and about 100 species.
OAT. [Avr.]

OATH. The privilege long enjoyed by Quakers, Moravians, and Separatists, of giving their oaths upon solemn declaration, is by the Common Law Procedure Act, 1854, extended to all witnesses, who conscientiously object to be sworn. A willful false declaration in all these cases involves the party, by the provision of the statute, in the same penalties 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 forwarded 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 not included in the printed form. But many anomalies and imperfections arose out of this 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 1235 distinct heads of employment (some of them, it is true, identical) in the cotton manufactures of Lancashire; and in 1831 the enumerators had entered only 568 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 258 to 877.

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 are proud of the results obtained, selecting each 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 developed. Here and there the total numbers for 1851, Great Britain and the small adjacent islands, is set down at 20,959,477, of whom 10,223,568 are males, and 10,735,919 females. One-half of this total is 10,478,738. Now this is almost exactly identical with the number (10,416,860) of those set down as the domestic appellation as husband, widow, 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 hold heads and heads in the acquisition of wealth; of this half, 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, 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 dependents, having no definite occupation.
Of persons supplying dress, food, or domestic service.
Of persons employed in all other occupations.

When the Commissioners came to prepare their vast tables of the distribution of occupational classes, by townships, counties, districts, and towns, they had to determine how many different occupations should be given in each table. If the whole 1057 occupations, presently to be advertised 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 are only very limited in their geographical 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 tables. Thus, one table, for the whole of Great Britain, gives all the 1057 occupations; another, for a county, divides the workers who are above and those who are below 20 years of age, but not distinguishing the sexes. Another table gives the same occupations in classified instead of alphabetical order, distinguishing the ages to still greater minuteness, and also 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 694 Registration Districts, and in 89 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 persons having definite occupations, and these are again divided into 91 sub-classes, rather more than five to a class on an average. Thus:

I. Persons engaged in the general or local government of the country.
   1. National government.
   2. Local government.
   3. East India government.
II. Persons engaged in the defence of the country.
   1. Army.
III. Persons in the learned professions.
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 are in some degree unsatisfactory for the same reason; they expect inn-keepers, coffee-house keepers, eating-house keepers, lodging-house keepers, domestic servants, inn-servants, undertakers, dress-makers, shoe-makers, umbrella-makers, rag-gatherers, and washer-women, to be all included in one class, as they are in the schedules: class 4 consists of "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; they are 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, the printer in one and the painter in another, the engraver in one and the manufacturer in another, the carpenter in one and the cabinet-maker in another, and the chemist in one and the chemical manufacturer in another. All are thrown together in one class. The showman, the civil engineer, the publisher, the dyer—here is an odd group! Taking the 1057 occupations for males, just as they stand in the classified tables, the highest numbers are the following, comparing those exceeding 40,000 persons in each employment:

1. Agricultural labourers
2. Labourers (unskilled)
3. Farmers
4. Shepherds
5. Farm servants, indoor
6. Cotton spinners and weavers
7. Coal miners
8. Carpenters
9. Tanners
10. Blacksmiths
11. Masons
12. Porters and messengers
13. Merchant seamen
14. Woolen spinners and weavers
15. Domestic servants
16. Gardeners
17. Grocers
18. Butchers
19. Plumbers, painters, and glaziers
20. Cabin drivers
21. Bakers
22. Silk spinners and weavers
23. Engineers and machinists
24. Silk spinners and weavers
25. Clerks (commercial)

Among females, of 20 years of age and upwards, the highest numbers placed opposite definite occupations are the following:

1. Domestic servants (general)
2. Milliners
3. bbcq
4. Washermen and washwomen
5. Farm servants, in-door

These numbers, however, must not be used for any inferences, without taking others belonging to establishments collaboratively connected with them. Thus, the 401,930 general servants do not include about 200,000 others who enter themselves under the more specific designations of housekeeper, household, cook, nurse, and inn servant; the 205,477 milliners do not include the 143,212 who do not come under this class, and the 136,562 who wash women and combing and the 67,538 who are out-door servants. We find

Wives (not otherwise specified)
Children and relations at home, ditto
Children who attend school, ditto

The above must be remembered, as the 91 sub-class of males. The sub-class of females occupations are not quite so numerous, and differ a little (but a little) in designation.

The 17 classes, or 91 sub-classes are further subdivided into no less than 1057 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 classification 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 female in their character.

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 might be urged, as to the principle wherein the aggregation has been made. The classes and 11 are those here adverted to. This, however, is a matter on which opinions will inevitably clash; for, where offices or employments differ from one another by imperceptible gradations, and where each one may be regarded under many aspects, no one can determine 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 6 to comprise "people who are principally engaged in

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 a little) in designation.

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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 generally, without regard to age, sex, or topographical distribution, it may be given to give some idea of the manufacturing capacity, containing the Commissioners' own enumeration of the number of persons employed in 108 avocations in Great Britain, comprising all those for or in regard to which the numbers exceeded 10,000: mere domestic relationship, such as 'wife,' 'widow,' &c. is not taken into account, as is 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 labour, etc.</td>
<td>1,660,988</td>
</tr>
<tr>
<td>Domestic servant</td>
<td>1,085,791</td>
</tr>
<tr>
<td>Cotton, calico, manufacture</td>
<td>501,405</td>
</tr>
<tr>
<td>Schooling and dyeing</td>
<td>382,066</td>
</tr>
<tr>
<td>Labour (branch medical)</td>
<td>376,551</td>
</tr>
<tr>
<td>Farmer, grazier</td>
<td>373,627</td>
</tr>
<tr>
<td>Boot and shoe maker</td>
<td>306,785</td>
</tr>
<tr>
<td>Coal miner</td>
<td>299,115</td>
</tr>
<tr>
<td>Carpenter, joiner</td>
<td>187,776</td>
</tr>
<tr>
<td>Army and navy</td>
<td>173,773</td>
</tr>
<tr>
<td>Tailor</td>
<td>109,320</td>
</tr>
<tr>
<td>Workman, mangleter, mangler</td>
<td>89,344</td>
</tr>
<tr>
<td>Laundry, keeper</td>
<td>76,714</td>
</tr>
<tr>
<td>Woolen cloth manufacturer</td>
<td>72,182</td>
</tr>
<tr>
<td>Messenger, porter, errand boy</td>
<td>71,181</td>
</tr>
<tr>
<td>Linen, flax manufacturer</td>
<td>68,060</td>
</tr>
<tr>
<td>Neaman (merchant, seller or buyer)</td>
<td>60,928</td>
</tr>
<tr>
<td>Grocer, draper</td>
<td>60,487</td>
</tr>
<tr>
<td>Gardener</td>
<td>50,023</td>
</tr>
<tr>
<td>Ironmonger, joiner, founder</td>
<td>48,917</td>
</tr>
<tr>
<td>Blacksmith (appointed official)</td>
<td>48,917</td>
</tr>
<tr>
<td>Boiler, head painter or porter</td>
<td>37,327</td>
</tr>
<tr>
<td>Linen, calico, manufacture</td>
<td>35,178</td>
</tr>
<tr>
<td>Fence, painter, glazier</td>
<td>33,757</td>
</tr>
<tr>
<td>Carman, caddy, cartier, ganger</td>
<td>33,257</td>
</tr>
<tr>
<td>Charwoman</td>
<td>25,423</td>
</tr>
<tr>
<td>Dry goods to the whole number</td>
<td>40,096</td>
</tr>
<tr>
<td>Commercial clerk</td>
<td>35,697</td>
</tr>
<tr>
<td>Cabinet-maker, upholsterer</td>
<td>30,470</td>
</tr>
<tr>
<td>Tailor, basket maker, govener</td>
<td>30,075</td>
</tr>
<tr>
<td>Fisherman, man</td>
<td>27,243</td>
</tr>
<tr>
<td>Boat, barge, man, miller</td>
<td>27,039</td>
</tr>
<tr>
<td>Engineer, man</td>
<td>20,314</td>
</tr>
<tr>
<td>Millwright, etc.</td>
<td>17,434</td>
</tr>
<tr>
<td>Shipwright</td>
<td>16,181</td>
</tr>
<tr>
<td>Joiner, cabinet-maker</td>
<td>15,608</td>
</tr>
<tr>
<td>Shipwright, engine maker</td>
<td>12,634</td>
</tr>
<tr>
<td>Railway engineer, etc.</td>
<td>12,634</td>
</tr>
<tr>
<td>Joiner, cabinet-maker</td>
<td>12,634</td>
</tr>
<tr>
<td>Shipwright, engine maker</td>
<td>12,634</td>
</tr>
<tr>
<td>Railway engineer, etc.</td>
<td>12,634</td>
</tr>
</tbody>
</table>

**350 masters employ from 100 to 150 men each:**

<table>
<thead>
<tr>
<th>Number</th>
<th>236</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>300</td>
<td>350</td>
</tr>
<tr>
<td>350</td>
<td>400</td>
</tr>
</tbody>
</table>

**1145 masters each employ 100 men or upwards:**

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, how on gigantic scale the cotton-mills of that county are conducted. Not less than 106 of the Lancashire mills employ more than 350 hands each; how much more, here, is not stated in detail. There are also 10 engineers or machine masters, each of whom has at least 350 workpeople.

In London the number of workpeople employed by the respective masters differs, of course, from that observable in country lists. In the large conurbations, for instance, 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 68 of 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 pianoforte manufacturers, 9 each of bookbinders, gunsmiths, masons, tanners, silk manufacturers, drapers, tobacconists, confectioners, silversmiths, iron-manufacturers, mineral-workers, and 1 each of hatters, tailors, omnibus-proprietors, coach-makers, carpenters, dyers, brewers, sugar-refiners, cooperers, brickmakers, gas-fitters, and cutlers, and a few are very questionable. For instance, among shipbuilders in the metropolis, there is not one entered with so many as 50 men in his employ; among distillers and recifiers, not one with so many as 20; evidently there are great omissions here. Again, when we find that there are only 6 vinegar makers, 9 dye manufacturers, 1 law-stationer, 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 Table: "Many employers of the increasing number of small tradesmen directed 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 establishments in the metropolis, are, in many respects, the most important 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 to how 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>842</th>
<th>Carpenters</th>
<th>569</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailors</td>
<td>460</td>
<td>Cabinet-makers</td>
<td>253</td>
</tr>
<tr>
<td>Butchers</td>
<td>246</td>
<td>Painters and glaziers</td>
<td>521</td>
</tr>
<tr>
<td>Shoemakers</td>
<td>668</td>
<td>Grocers</td>
<td>242</td>
</tr>
</tbody>
</table>

The table is to be understood thus: that in the above eight occupations there are 3183 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,' perhaps), and 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>Total</td>
<td>283,378</td>
</tr>
<tr>
<td>Under 100</td>
<td>190,743</td>
</tr>
<tr>
<td>100 to 200</td>
<td>52,912</td>
</tr>
<tr>
<td>200 to 500</td>
<td>20,603</td>
</tr>
<tr>
<td>500 to 1,000</td>
<td>2,021</td>
</tr>
<tr>
<td>1,000 to 2,000</td>
<td>406</td>
</tr>
<tr>
<td>2,000 to 5,000</td>
<td>524</td>
</tr>
<tr>
<td>5,000 to 10,000</td>
<td>2,816</td>
</tr>
<tr>
<td>10,000 or more</td>
<td>1,192</td>
</tr>
</tbody>
</table>

and upwards.

Besides the above, there were 2658 farms of which the sizes were not stated in the returns; making 285,936 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 170 farmers employ more than 600 each, while all the rest have in their service a number varying from 1 to 60.

Professional avocations, as distinguished from trading and manufacturing pursuits, present a few interesting facts, which may be put together in the following form:

**Persons engaged in the government of the country—**
- **Civil service**
  - Males: 30,849
  - Females: 1,487
- **Local service**
  - Males: 22,051
  - Females: 1,113
- **East India (in England)**
  - Males: 3,774

**Persons engaged in the defence of the country—**
- **Army:**
  - Males: 70,718
  - Females: 26,796

**Persons engaged in religious duties—**
- **Clergymen of national churches**
  - Males: 16,567
  - Females: 2,411
- **Other ministers**
  - Males: 6,614
- **Subordinate officers**
  - Males: 6,671

**Persons engaged in law and justice—**
- **Judges**
  - Males: 85
- **Baristers, advocates, &c.**
  - Males: 3,111
- **Solicitors, attorneys, &c.**
  - Males: 13,582
- **Law agents**
  - Males: 1,659
- **Law clerks, &c.**
  - Males: 19,149

**Persons engaged in the medical profession—**
- **Physicians**
  - Males: 2,928
- **Surgeons and apothecaries**
  - Males: 15,163
- **Chemists and druggists**
  - Males: 15,333
- **Students and assistants**
  - Males: 3,655
  - Females: 2,012

**Miscellaneous**
- Males: 571

*But the total of the Queen’s forces, at home and abroad, naval and military, including non-commissioned officers, was 228,078.*

It is necessary to bear in mind that many dissecting museums are in the Census returns, entered under the occupations which they follow during the week.

Persons engaged in literature, the fine arts, and sciences—
- **Males:**
  - Writers, editors, &c.: 3,249
  - Artists, architects, &c.: 6,609
  - Scientific persons: 496
- **Females:**
  - Professors and teachers: 8,410

As before noticed, there is more confusion between Class 4 and Class 11. In the list here given, although artists are included in Class 11, it must not be inferred that they are, but not singers; dramatists 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.

**Actors and actresses, theatre servants—**
- Males: 1,485
- Females: 798

**Engravers—**
- Males: 5,507

**Model makers and modellers—**
- Males: 2,263

**Pattern designers—**
- Males: 707

**Draughtsmen—**
- Males: 1,016

**Medallists and die-sinkers—**
- Males: 489

**Supposing that the above may be fairly reckoned as professional employments, it appears that on Census-day in 1861, there were 344,464 males and 78,467 females thus occupied. These comprise 1 in 30 of all the males, 1 in 140 of all the females, and 1 in 50 of the whole population. If we omit the sailors and soldiers from the list of professional men, the fraction becomes 1 in 120.

Perhaps it will ultimately be found that the most valuable tables in the Census Reports are those which establish a comparison between different parts of the country. Large generalizations could not be made from the tables which relate to the whole of Great Britain; but for comparison and extension 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 Wales differs from England, and Scotland from England; but far the 10 Divisions into which England is separated differ one from another in characteristics; in what way the 40 English Counties, 12 Welsh Counties, and 32 Scotch Counties exhibit peculiar characteristics; by what peculiarities the 692 registration districts or poor-law 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 employment generally in the metropolis. Confining our attention, at present, to males, and to males only of 20 years and upwards, we find the following facts: That out of the 5,490,815 males of 20 years and upwards in Great Britain, 632,945 live in the metropolis; that the London shoemakers number 26,689, and the London tailors, 30,527; that there are no fewer than 25,706 domestic and inn servants; that the commercial establishments are so numerous and important as to employ 15,133 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, 13,917 painters and glaziers, and 16,038 bricklayers and plasterers; that among those who supply us with food and drink, there are 9,941 bakers, 7,428 butchers, 4,456 grocers, 6,474 furnishers, and 10,623 millers and millers; that out of 5,490,815 males of 20 years and upwards in Great Britain, 767,418 are in London. Of this number, 316,157 designate themselves simply as wives; and 36,627 simply as widows, and about 40,000 as daughters, without any dependence, but who do not appear to earn their living by the labour of their own hands or brains, there are no fewer than 116,855 domestic servants of various
kinds, 73,620 needlewomen of various kinds, and 45,754 charwomen, washerwomen, and manglers. These, with 37,600 women employed in domestic service, 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 the principle is the range of female employment in London. They indicate, among those who are dependent on relations for support, and those of independent means, there were 330,000 adult females in London in 1651 dependent on their own exertions for their daily bread. It is also well to remember the number of families in comfortable circumstances in London, to give employment to nearly 120,000 female servants, and 45,000 laundry- and char-women.

But now let us compare one of the manufacturing counties of Northumberland with Lancashire, and see how far a similar principle seems to determine the distribution of occupations. We take the cotton-spinning county of Lancashire. Here we have 530,075 males of 20 years of age or upwards, against 632,465 in the metropolis; that is, in the ratio of about 65 to 100. Different indeed, however, is the ratio in regard to employments. We have seen that the metropolis contains about 28,000 male adult servants, 31,000 drivers and porters, 27,000 shoemakers, 21,000 carpenters, 20,000 tailors, 18,000 bakers, 15,000 tailors, 11,000 victuallers, and 8,000 in Lancashire, these eight occupations exhibit the numbers, 4708, 9127, 15,443, 15,146, 11,346, 7658, 7643, 6336— all far below the ratio in respect to total inhabitants. In London there are 35,000 persons in the public service, receiving contributions from the community large in number, in Lancashire there are only 11,000. In London there are 34,000 professional men, engaged in divinity, law, physic, science, and fine arts; in Lancashire the number is 11,000. In London there are 14,000 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 65 in each of these employments. But let us extend our inquiry into the trades in Lancashire and see what is the proportion. 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 56,000 of these in the metropolis, 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 the merchants to do no more than 6,000 of the men in the numbers of persons connected with ships, boats, and barges in various capacities; in the metropolis, this number is about 31,000, in Lancashire 18,000—very nearly, indeed, in the ratio of 100 to 65. But it is in textile manufactures, and in cotton manufactures in particular, that most of the men in Lancashire are employed, and which 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; 3000 quanrymen, 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 122,000 in London, and 55,000 in Lancashire; of silk-workers, 8000 in London, and 21,000 in Lancashire; of tailors, 10000 in London, and 9000 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 465,749 and 478,046. Now in the metropolis, after deducting 770,000 young persons who are employed only in their domestic or family relations, without connection with any particular employment, there remain about 200,000 who are considered to have some occupation or other; while in Lancashire, of the 770,000, 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 turn now to other phases of metropolitan employment. Of the whole 2,362,226 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 distributed between sex. In order to show, then, how far male employments 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, 20 and upwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>1,280</td>
</tr>
<tr>
<td>Messengers and porters</td>
<td>19,748</td>
</tr>
<tr>
<td>Printers, &amp;c</td>
<td>3,218</td>
</tr>
<tr>
<td>Silk manufacturers</td>
<td>3,896</td>
</tr>
<tr>
<td>Cabinet-makers</td>
<td>2,561</td>
</tr>
<tr>
<td>Gold and silver work</td>
<td>1,145</td>
</tr>
<tr>
<td>Brass work</td>
<td>1,068</td>
</tr>
<tr>
<td>Building trades</td>
<td>5,951</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under 20, 20 and upwards</td>
</tr>
<tr>
<td>Teachers</td>
<td>1,514</td>
</tr>
<tr>
<td>Servants</td>
<td>46,324</td>
</tr>
<tr>
<td>Needlewomen</td>
<td>9,184</td>
</tr>
<tr>
<td>Silk-workers</td>
<td>2,375</td>
</tr>
<tr>
<td>Paper-workers</td>
<td>625</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, and noticing the difference of age in a similar manner, we find the following:—

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Under 20, 20 and upwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>1,514</td>
</tr>
<tr>
<td>Servants</td>
<td>46,324</td>
</tr>
<tr>
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</tr>
<tr>
<td>Silk-workers</td>
<td>2,375</td>
</tr>
<tr>
<td>Paper-workers</td>
<td>625</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 small shopkeepers. As for females under 18 years of age, they would be servants, needlewomen, and teachers.

The 36 districts of London exhibit many remarkable groupings in reference to employments. 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 was no reason to expect; except those who live about Chancery-lane and the inns of court, are found in greater relative numbers at Islington. The authors, editors, artists, and architects, are found in small number south of the Thames, or in the eastern half of the metropolis; Marylebone, St. Pancras, and Kentish Town are their 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 Kensington—indeed overwhelmingly so. The tailors are strong in St. James's, Marylebone, and St. Pancras, but relatively more so 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 Kensington and Wandsworth as their chief districts. Beyond all other districts, the City is the locality for publishers and booksellers, for it contains the region most frequented by booksellers, and most of the courts around Fleet Street. Musical instrument makers congregate in decided preponderance in St. Pancras. There are two districts in which watchmakers appear in surprising force; these are, as may be supposed, Clerkenwell and St. Luke's. Coachmakers in Pancras and Marylebone; shipbuilders in 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 25 districts combined); sugar refiners nearly all in Stepney, Whitechapel, and St. George's in the East; cabinet and furniture makers, Pancras, and especially Shoreditch; cooperers, in the districts nearest the various docks; rope and sail makers, Stepney and Bethnal Green; workers in gold, silver, and precious stones, Clerkenwell; all these is the chief associations between occupations and districts.

And so, in like manner, there are certain occupations for
adult females, which seem to be carried on in some districts rather than others. Domestic servants and governesses are, relatively to population, most numerous in the districts of Kensington, Marylebone, and St. George's Hanover Square; while schoolmistresses, as distinguished from governesses, are relatively as numerous in other districts. The charwomen are scattered in all the districts. Those engaged in the hat manufacture, binding, and so forth, are in Southwark and Bermondsey, where most of the hat factories are situated. The women tailors, who make waistcoats and cheap goods for the slop shops, are chiefly in the three eastern districts. The tailors at 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 Stepney and St. George's in the East. Stickmakers are in Marylebone chiefly. The washerwomen and mantlers 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 more generally to be found in Whitechapel and St. George's in the East. The hawkers and pedlars are chiefly in the four districts just named. Artificial flower-makers in St. Pancras; silk workers in Bethnal Green; upholstery workers in Marylebone; lace workers in the same district—these 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 much time is lost, and the classification carried. But we may be 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 manufactures; Sheffield for cutlery, Birmingham for small metal works, Manchester for cotton, Leicester and Nottingham for hosier, 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, there may be certain districts containing no very large towns, but in which some particular manufacture is nevertheless carried on to a remarkable extent; such as straw-plain, 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 prevailing 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 18,640, and above 20 years 61,276; the females under 20 years of age are 18,380, and above 20 years 61,326; or 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>53,380</td>
<td>105,020 under 20 years</td>
</tr>
<tr>
<td>61,276</td>
<td>63,345</td>
<td>124,621 20 and upwards.</td>
</tr>
</tbody>
</table>

119,916 + 118,925 = 238,841 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 works. 2000 men making guns, 1800 making machines and tools, 2400 working in gold and silver, 3000 brass founders, 1400 button makers, 1200 white and blacksmiths, 1400 iron and 4000 nail makers. These are among the men of 20 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; for example—1,300 young females and 1,600 adult females in making buttons; 700 and 1,100 in miscellaneous works in mixed metal; 800 and 1,900 in milliners, iron and steel works.

Manchester and Salford. —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 under 20 years</td>
</tr>
<tr>
<td>104,506 + 120,817</td>
<td>225,327 20 and upwards.</td>
<td></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 other towns may generally 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, comprises employed in all 18,500 men, 8,600 women, 14,503 women, 9,051 girls, making a total of 42,603, in which the females exceed the males by 23,654 against 18,949. Putting the whole of the textile manufactures together—relating to cotton, flax, silk, and wool, they appear to employ about 32,000 men, 20,000 boys, 20,000 women, and 12,000 girls, exhibiting the remarkably near equality of 33,000 males to 32,000 females—more than 1 in 7 of the entire population of Manchester and Salford employed in making the textile manufactures. Here, besides 12,000 tailors and seamstresses employed in making up textile manufactures, we fall in upon a 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>11,782 + 12,745</td>
<td>24,528 under 20 years</td>
<td></td>
</tr>
<tr>
<td>14,805 + 18,074</td>
<td>32,879 20 and upwards.</td>
<td></td>
</tr>
</tbody>
</table>

26,587 + 30,829 = 57,407 total population.

Of course the numbers in any particular occupation 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, 2,459 men, 500 boys, 1,879 women, 634 girls, making nearly 6,000 persons, or more than one-twelfth of the whole of the inhabitants employed, employed in this one branch alone. The bobbin-net manufacture employs 1,576 men, 517 boys, 3,277 women, 1,802 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 hosiery 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.

Methyr Tydfil. —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 + 13,629</td>
<td>27,985 under 20 years</td>
<td></td>
</tr>
<tr>
<td>19,590 + 15,443</td>
<td>35,033 20 and upwards.</td>
<td></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 2,000 persons engaged 'coal-miners, 4,302 men; and among iron workers are 2,038 boys and 6,615 men; 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. Considerably more than half the male population of Methyr Tydfil are workers in iron and coal, employed chiefly in the great establishments of Dowlais, Cyfarthfa, Pen-y-darren, and Plymouth works.

Bradford. —This busy Yorkshire town introduces us to a wholly different class of manufactures. The parliamentary borough is somewhat extensive, and includes some of the neighbouring villages, comprising a population of—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>22,934 + 24,899</td>
<td>47,833 under 20 years</td>
<td></td>
</tr>
<tr>
<td>27,932 + 20,413</td>
<td>48,445 20 and upwards.</td>
<td></td>
</tr>
</tbody>
</table>

49,966 + 53,912 = 103,778 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 15 contains the employments characteristic of Bradford. Here we entered, under weaving, 18,000 male manufacture, 5381 boys, 10,759 men, 7936 girls, and 8780 women—a powerful body of about 33,000 persons (nearly a third of the whole population) employed in worsted and stuff manufactures; also in woollen cloth, the silk, and the cotton manufactures, occupy perhaps 1000 altogether, showing how insignificant they are at Bradford.
Leeds.—The borough contains—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36,468</td>
<td>38,587</td>
<td>75,055</td>
</tr>
<tr>
<td>43,546</td>
<td>48,589</td>
<td>92,135</td>
</tr>
<tr>
<td>83,714</td>
<td>88,176</td>
<td>171,890 total population.</td>
</tr>
</tbody>
</table>

We devote a short paragraph to Leeds, for the purpose of showing how remarkable a contrast may be presented in the industry of two towns situated only about ten miles apart. Bradford and Leeds both work up wool largely; but Bradford prepares it for stuff or worsted fabrics, while Leeds prepares it for woolen cloth. Leeds has 29,280 boys, 7,640 men, 1,710 girls, and 2,284 women employed in making woolen cloth: while the stuff and worsted manufacturers here employ 1,000. Leeds also has over 1,000 large manufacturing towns in other respects; for it employs about 9,000 persons in the flax manufacture, and 3,000 in making engines and machines. Relatively to the population, Huddersfield is perhaps more peculiarly associated with Leeds than with the woolen cloth manufacture.

Macclesfield.—Having given a idea of the distribution of occupations in the towns which may be regarded as the chief seats of the cotton, woolen, and stuff manufactures, let us do the same in reference to the silk-workers of Macclesfield borough—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,299</td>
<td>8,735</td>
<td>17,034 under 20 years.</td>
</tr>
<tr>
<td>10,542</td>
<td>11,772</td>
<td>22,914 20 and upwards.</td>
</tr>
<tr>
<td>18,541</td>
<td>20,607</td>
<td>38,048 total population.</td>
</tr>
</tbody>
</table>

There are 2462 boys, 4,772 men, 2,979 girls, and 4,330 women employed in the silk manufacture, making an aggregate of about 14,500 persons, considerably more than one-third of the entire population. The males and females are employed in almost exactly equal numbers, 7,354 to 7,318.

Sheffield.—In this cutlery borough there are—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,028</td>
<td>5,270</td>
<td>10,298 under 20 years.</td>
</tr>
<tr>
<td>36,392</td>
<td>35,698</td>
<td>72,090 20 and upwards.</td>
</tr>
<tr>
<td>67,390</td>
<td>67,310</td>
<td>134,700 total population.</td>
</tr>
</tbody>
</table>

In the classes relating to the supply of food, clothing, and dwellings, Sheffield contains a number fairly proportionate to its population; but it is only in class 14 that the industrial characteristics make their appearance. The works in gold, silver, steel, iron, and mixed metals employ about 20,000 men and boys at Sheffield. Females are very little employed in the metal trades, thereby presenting a striking contrast to the circumstances at Birmingham. No fewer than 2,461 boys and 7,044 men are employed in making and grinding cutlery and files alone.

Glasgow.—There are two or three Scotch towns which present remarkable characteristics. Glasgow—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18,057</td>
<td>16,057</td>
<td>34,114 under 20 years.</td>
</tr>
<tr>
<td>82,454</td>
<td>100,574</td>
<td>184,029 20 and upwards.</td>
</tr>
<tr>
<td>154,929</td>
<td>174,167</td>
<td>329,096 total population.</td>
</tr>
</tbody>
</table>

This busy city is worth of note for the degree in which it combines cotton working and iron working, two departments of industry which certainly do not seem to have any necessary bond of connection. There are 3449 boys, 11,571 men, 9,629 girls, and 14,442 women—about 15,000 men and 26,000 females—employed in various branches of the cotton manufacture. Of all the females in Glasgow, in every age and condition, one in seven are employed in this manufacture. There are, in respect to metal trades, 2600 machine and tool makers, 4000 miners and manufacturers, and 5400 other workers in metal—almost wholly females.

Dundee.—This is the great centre of the flax and linen manufacture of Scotland. Dundee contains—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,444</td>
<td>17,509</td>
<td>34,953 under 20 years.</td>
</tr>
<tr>
<td>18,420</td>
<td>25,068</td>
<td>43,488 20 and upwards.</td>
</tr>
<tr>
<td>35,864</td>
<td>43,067</td>
<td>78,931 total population.</td>
</tr>
</tbody>
</table>

Of these numbers there are 2713 boys, 6161 men, 4300 girls, and 6565 women employed in flax and linen manufactures, being almost exactly one-fourth of the whole population—a ratio 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 Portsmouth, 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 private persons employed as seamen or as shipwrights. At Leicester, out of 60,000 inhabitants, 10,900 are engaged in Worstings, 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 Stafford, 10,000 boys and 1700 men are making worsted stockings, and the ratio of one to four of the whole male 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 7600 are employed upon metals or upon coal; no less than 1400 make locks alone. In Dudley the ratio is as high, about 6000 out of 19,093. Coventry is remarkable for two trades, about as diverse as any two can be, ribbon-making and watch-making: out of a population of 36,612, nearly 10,000 persons, of whom 6500 are females and 3500 are silks and ribbons: while 1700 men and boys are making watches. At Stockport, 17,000 persons are employed in cotton manufactures, out of a total population of 53,385—nearly one in three; at Blackburn, 6,000 out of 32,000 inhabitants, or more than one in five; at Bolton, 14,500 out of 61,171; at Oldham, 20,000 out of 72,307; at Preston, 18,000 out of 69,542. Thus, in these five cotton spinning and weaving towns, containing an aggregate of about 300,000 inhabitants, about 34,000 males and 42,000 females—considerably more than one-fourth of all the inhabitants—are engaged in this manufacture. Looking at the distribution of workers in reference to age, we find that there are about 33,000 children and young persons under 20, and 43,000 adults and elderly persons out of 31,000 inhabitants, nearly 9000 are employed in various kinds of textile manufacture, of which the principal is shawls.

Hitherto, in the above paragraphs, we have spoken of distinct towns, each with defined limits and defined number of inhabitants. But a few remarkable manufactures are centred rather in districts than in large towns.

In Staffordshire, the registration county which often differs slightly from the parliamentary county (being the real county), contains 320,903 males and 309,641 females. Now it is plain, on a little examination, that the main departments of industry whereby these are supported have relation to mineral manufactures; and it is further observable, on comparing the several districts, that while the southern exhibit the metallic and colliery operations, the northern are associated with earthenware manufactures. In short, we have the Wolverhampton region of the south, and the pottery region of the north. There are 27,000 males and 10,000 females in pottery and earthenware manufactures. It is worthy of note that in the two districts or Poor Law Unions of Stoke-upon-Trent and Wedleston, containing the pottery towns of Stoke, Hanley, Lane End, Delph, Etruria, Shelton, Burslem, &c., out of a population of 51,000 adult males and females, more than 13,000 are engaged in the earthenware manufacture. And it is to be observed that the district of South Staffordshire, it would perhaps scarcely be expected that 6000 women are engaged in nail-making.

Berkshire, containing 62,533 males and 67,966 females, is not a county likely to contain large manufacturing establishments of any kind; but there are, nevertheless, two or three entries in the tables which deserve attention. There are, we find, 5200 men and more than 10,000 females engaged in the straw-plait manufacture; together with nearly 6000 females employed in lace and lace-making. One fourth of all the females in the county, of all ages and conditions, are employed in one or other of these two occupations. In Buckinghamshire, containing 70,938 males and 72,747 females, the straw-plait trade is smaller, employing only 2000 females; but the lace-trade is about as extensive as in Bedfordshire, employing nearly 11,000 females. In Hertford-
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We almost entirely lose the lace-trade; but the straw-plait employs about 9000 females out of 87,497. In Cambridge, these are about 500, and in Little Claire, only 10.

Cornwall is rich in metals, but has no coal. It has 172,193 males in the (registration) county. Among these are 3000 seamen and 2600 fishermen; but when we come to class the males employed in the busy trade, we find, 25,000 tin-miners, more than 10,000 tin-miners, 2500 lead-miners, and about 6000 employed in other ways on metals and minerals; none, however, in coal. 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 207,068 males, and 204,981 females, a departure from the general rule; for here we find more males than females. Now the county contains both the busy trade and the hay trade; and the busy trade is not engaged in 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 the hay trade is an important one. But the much larger item is that of 29,000 men and boys employed 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 148,615 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 the numbers. Farmers get great help in this respect. Five of the coal-miners of Northumberland seem entered as being upwards of 90 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 partly to the iron manufacture, but still more decidedly to coal-mining. The counties of Montgomery and Glamorgan. Montgomery-shire contains 95,301 males, and 87,260 females. 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; but not much employed in these trades in this county. Glamorganshire, containing the remarkable towns of Merthyr and Aberdare and their vicinity, has a population of 125,057 males and 115,060 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, Caermarthen, 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 country. The explanation of this is, that nearly all the copper ores of Cornwall and Devon are sold on the spot to copper-smellers, who have their works at Swansea or Neath, or at some similar place in Caermarthen-shire. But besides the copper workers there are, among the 125,057 males in this county, 14,000 workers in iron, and 16,000 coal-miners.

There are about 120,000 engaged in various departments of wool and worsted manufactures; and out of 673,159 females, about 90,000. In all the West Riding of Yorkshire, out of 606,918 males of all ages, there are about 120,000 engaged in various departments of wool and worsted manufactures; and out of 673,159 females, about 90,000. In all the West Riding of Yorkshire, out of 606,918 males of all ages, about 15,000 are under 20 years of age. In comparing 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 the worsted trade; and, in the worsted trade, that the female workers in Yorkshire are more numerous; and in a subservient capacity, about 1 in 6 of the West Riding population is engaged in the wool manufactures.

Such are a few of the most striking results obtained by the compilation of the returns of the registration and census for the year 1861. The year 1861 is the year of the census, and the returns are required to be furnished to the returns for the year 1861. The 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 and New Zealand. Only the inhabited groups of islands in the Pacific within the limits stated above are included in the islands of the mainland of the eastern world.

O'Connell, Daniel, the eldest son of Morgan O'Connell, was born at his father's residence, near Cahirciveen, Kerry, August 6, 1775. The family of 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. He was the third son of a gentleman farmer, according to his MSS., for he sent him at an early age to "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 Cove, 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 persecuting laws which made it penal for a Roman Catholic to educate his children. In 1790 Daniel, then a boy of 14 years, was sent to a school kept by a Mr. Anderson, with the design of being sent to L'Isle; but on reaching that place he was found to be too old for admission, and accordingly he was entered at St. Omer's. There he remained till 1792, when he was sent to St. Cadoc's at Anglesey. Female pupils were not admitted there, and Mr. O'Connell established the Benedictines at Douai. Returning after a few months to St. Omer's, he rose speedily to the head of the college; and so arrested the attention of the then president, Dr. Stappleton, that he prophesied 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 Douai and St. Omer's. Daniel O'Connell succeeded in reaching Calais safely and, and, having 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, in 1794 entered himself a student 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 on the 5th of May, 1796, before a meeting of the Society of Dublin lawyers 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 attending a meeting of the Carlow numbers, in the society of Pembroke, 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 was not becoming gradually absorbed in the arena of political con-
tention. Emmett's trial was the starting point of a new era in the history of Irish agitation: the cruelty inflicted by the citizen-soldiers 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 proceedings of the Roman Catholic claims. "For more than twenty years," he writes to the late Lord Shrewsbury, "before the passing of the Emancipation Bill, the burden of the cause was thrown upon me. I had to arrange the meetings, to prepare resolutions, to make the representations, to call the case of each person complaining of practical grievances, to reuse the torpido, to animate the lukewarm, to control the violent and inflammatory, to avoid the shoals and breakers of the law, to guard against multiplied treachery, and at all times to make personal and continuous sacrifices of the most formidable enemies of the cause." Day and night he devoted himself with surprising energy to the work, without receiving pay or fee. 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 1808.

In 1816 Mr. O'Connell fought his duel with Mr. d'Estrete, and divided his Dublin corporation; and the misfortunes of Ireland's present stage of politics and the misfortune of his own life, inflicted upon his adversary a wound which ultimately proved fatal: it is but just to add that for this result he ever afterwards felt and expressed the most painful remorse. Mr. O'Connell's public life henceforth offers very little material for comment. The only piece of news that is worth noting is the death of the Roman Catholic Emancipation Bill was 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 the time had come for referring the question to the consideration of the legislature. In the June of that year the 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 to sit for Clare in the House of Commons for Westminster for the purpose of taking 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 enlivened, and though the times remained 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 minds think just and equitable, 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 Catholics of Ireland suffered. Mr. O'Connell was re-elected, and took his seat as member of Parliament in May 1829. In the following year, at the general election consequent upon the death of George IV., Mr. O'Connell exchanged the representation of Clare for that of his native county of Kerry. He represented Dublin from 1828 to June 1835, when he was unseated on petition, but was immediately 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 1841 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 violent and the ignorant as throughout the rest of Ireland. The church of Ireland on Oct. 8th in the latter year, was forbidden by government authority, and a state prosecution for high treason was commenced against Mr. O'Connell and the other ringleaders. Mr. O'Connell was convicted of sedition, sentenced to be imprisoned for life, but the judgment was reversed on appeal to the House of Lords; but the prosecution answered its intended end; the prestige and magic influence of the great '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 advance of Mr. O'Connell gave to their party, introduced dissensions and differences among the aristocracy and supporters, over whom for forty years he had exercised an all-powerful influence. His health began to fail, and he became sour by opposition, as well as depressed in spirits by the example of failure and 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 15th of May. His last words, were addressed to the Pope in 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 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 1860 to the Clerkship of the Hanover Office in Dublin.

(Left and Times of Daniel O'Connell, by his son, John O'Connell.)

OCTODON. [MURIDAE.]
OCTOPUS. [PAPA NAUTILUS.]
OBIHAN. [HAMMERHOOFED ANIMALS.]
OCHSINUM [OR TROPICAL PLANTS.]
OEHLSCHLAGER, ADAM GOTTLOBB, the greatest poet of Scandinavia and one of the greatest European poets of the 19th century, was born on the 14th of November 1770, at Stockholm, a suburb of Copenhagen. The whole of his early life was clouded by himself with singular misfortune, first in an autobiography written to be prefixed to a German edition of his works and afterwards in a series of 'Erindringer' or 'Recollections' which were published in 1817, when his death by the hand of his own wife is informed in the 'Erindringer' of the boy's first inclination to swear, and how his mother checked it, of his strong propensity to pull off the bed-clothes, and a variety of similar particulars, the whole of which put together supply a varied picture of the life of a Danish boy at the close of the 19th century.

The name of Oehlenschläger is German; his father was from Krusendorf, a village in Silesia, where the family had produced a long succession of schoolmasters and organists; and his mother Martha Maria Flaming, was of Swiss parentage by the father's side, of Danish by the mother's. "Thus," says Oehlenschläger, "I am descended from both Danes and Germans, and it seems as if Fate had determined that I should find my vocation among the nations. My father had fallen much below the respectability of his ancestry by becoming a servant to Count Adam Gottlob Moltke, after whom the poet was named; but on his marriage with the countess lady's-maid he obtained by the count's patronage the post of organist at Frederiksberg, and afterwards of some subordinate position at the castle of that name, where he finally rose to be steward. Frederiksberg, one of the numerous palaces of the king of Denmark, a building which is said by some to have been erected from the plans of Inigo Jones, stands about two English miles from the western gates of Copenhagen, and is a favourite Sunday resort of the inhabitants of the capital. Here the early life of young Adam was passed amid scenes of great variety. In the summer Frederiksberg was often occupied by the royal family, and here the royal hand of music play on Sundays, and saw the royal company at dinner. In the autumn the place of the court was supplied by a legion of workpeople, busy with repairs; and in the winter the building was left in charge of the Oehlenschläger family, us, in short, the children of his paternal grandsire, who had been left the lordly mansion with two watchfires. 'That whole palace,' says Oehlenschläger, 'belonged to us, and I went about in the royal rooms, looking at the paintings and building castles in the air."

The name of Oehlenschläger in the winter was reading novels, which he got from a circulating library in Copenhagen, and of which he tells us that before he was twelve years old he had got through more than three hundred volumes. All that he read was Danish—a circum-"
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 give him a gratuitous education. He went to a public school in Copenhagen, if his father would be 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 his house. So much was it understood, that the 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 should have some time to prove that he could never be another Edward Storm. The education he received was designed 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 counting-house, and readily persuaded his indolent father, who was now 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. Theatrical matters are generally held in low estimation in the serious light in a foreign city than in an English one, and at Copenhagen the management of the drama was treated with unusual solemnity. In Rabbeek's Lectures on the Drama, delivered in the University of Copenhagen, stage is a matter of private engine hardly secondary in importance to the pulpit. With the exception of the comedies of Holberg, the Danish Molière [Hansaas], the plays which were performed were then chiefly translated. "Of English pieces," says Oehlenschläger, "the first school of Copenhagen, was that much which Rosing was an excellent Sir Joseph [Joseph Surface], and 'She Stoops to Conquer,' in which Gielstrup was an incomparable 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 acquaintance 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 eldest, Ores, occupied the stage; the second, a sort of companion picture to 'Hakan Jarl,' in which Odin- ism is shown in a more favourable point of view, and the latter a love tale of the middle ages. At Paris he was welcomed by Baggesen, who had before his own rise occupied the highest position in the Danish Parnassus; and when Oehlenschläger read to him the 'Palmatokes' the impetuous poet flung himself at his feet in transports of admiration.

On the 12th of April 1803 when Nelson attacked the Danish fleet off Copenhagen, Oehlenschläger saw the fight at a short distance, from the balcony of the Sea-Cadets' Academy, and he 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 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 Armada the English in the time of Elizabeth. Some great disaster will forever be able 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 1804 appeared a volume of poems, containing among other works, the play of 'The Battle of Salamis,' which once looked forward to as a writer of some note. The play, or rather dramatic tale, of 'Aladdin,' which followed, founded on the well-known story in the 'Arabian Nights,' captivated the public, in spite of some very obvious faults, by the general vividness 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 'Aladdin' he had discovered his own 'wonderful lamp,' the vein of poetry which was to give him fame and fortunes. He received in 1806 a travelling stipend from the government, procured for him by Count Schimmelmann, and set out on a tour to Germany, to make the acquaintance of the band of literary men who at that time invested Germany with a halo. The second visit to Denmark was occasioned by the account of his travels, and of his intercourse with Göthe, Wieland, Tieck, Hegel, Voss, and other poets and philosophers. Up to his twenty-fourth year he had never written a line of German, but he was now so wrapped up in his illuminating friend's some notion of his poetical capacity that he translated his new compositions into German as fast as he wrote them, and somewhat unnecessarily occupied the time of many of them by availing himself of the permission to read his productions to them in manuscript, and take their opinion not only on the merits or defects of the structure and the poetry, but on the correctness or incorrectness of the language. It is not a little singular that productions so thoroughly Scandinavian in their tone and spirit should have been written in a foreign land and partly composed in a foreign tongue. 'Hakan Jarl' was written at Haile. It is a tragedy in five acts, on the fortunes of the old Swedish hero Ragnvald, who, when the Ottoman Turks were about to send a grand army against Scandinavia, was about to struggle between the two religions, Christianity and the belief in Odin. Nothing can well be more different than a tragedy of the old French school and such a tragedy as 'Hakan Jarl.' As the reader of 'Ivanhoe' finds himself, the reader of 'Hakan Jarl' is made as well as a part of the interested in the fortunes of Wilfrid and Rowena, but also well-informed and perhaps not less interested in the whole framework of the country around them, cognisant of the relations of the hero with the house of Saxons, of the eminence of the king and the Templars, of the ceremonies of a tournament and an ordeal, of the condition of serfs and Jews, so the reader of 'Hakan Jarl' sees before him the old tyrant superstition clinging to the wild religion of Valhalla, the young champion eager for the triumph, the Cross, the rude but independent Norwegian boor, the churning northern slave, the ambitious serf who carelessly espouses the new faith because it promises him a better career. An unceasing vivacity pervades the work, and there is not only pathos but humour; nothing can be further removed from the unvarying solemnity and systematic monotony which have by some been thought essential to the character of a tragic drama.

Oehlenschläger, before quitting Germany, was accidentally present at Weimar on the day of the double battle of Auerstadt and Jena, and in some danger when the victorious French entered the town. From Germany he went to Paris, where he composed what is by some regarded as his finest tragic poem, 'Adelheid,' a history of the Danish king Harald, son of the great Harald Bluetooth, and Julia Romanus, as two of the persons of the drama, affords the dramatist an opportunity of painting more than one variety of the artistic character. Few of Oehlenschläger's works merit the patient going through of judgments than this. Treated with disdain by Göthe, it was at last piously cavilled at by Tieck, and Cotta the publisher of Tübingen, after purchasing the German copyright, kept the play by him for years unpublished. Meanwhile the writer, after staying
some time in Italy, beginning to feel home sickness, returned to
Denmark after an absence of nearly five years, and read that
timeenhiscorometrics and the circles of the capital, among others to the king and queen of
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 a run of success of thirty years; and it also became a
favourite in Denmark. A translation of it into English, by
Theodore Martin, published in 1884, has met, we believe,
with a general welcome, and all English critics regard 'Correggio' as one of Oehlenschläger's principal titles to
fame.

Oehlenschläger had left Denmark in 1805, an eminent
rising poet. His reputation had risen higher and higher during
the years of the Revolution, and his influence, though he had
never been called upon, was without a rival. Before he set out on his travels he had
engaged the hand of Christine 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 1800, and continued till 1820, 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 aesthetics at the university, and Oehlenschläger
observed that he was left behind was being during
himself, if he pleased during the summer terms, which was a privilege he did not neglect to make use of. Being thus provided
with an income, he celebrated his wedding in an unusual
way, but precisely in the style that Rogers, the English poet,
was accustomed to say would have been if his, had he ever
ceased to be a bachelor. "On the 17th of May, 1810," says the
"Evenrider," "I dined with Christine at her
father's at Copenhagen, afterwards she and I drove by
ourselves to Gienioles, where Peter 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,
drove off to the beautiful Christiansholm, to Sölyat, which
Count Schimmelmann had the kindness to offer us for a summer's residence. Upon the
notion that her husband had lost much by his dealings with the book-sellers, 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
business, and his wife no more; a conviction which says, however,
that his wife could never be persuaded to share.
During the next five years he wrote a number of plays of
various kinds, but was not quite satisfied in the composition
of abit, and his peace was disturbed by his failure in
the literary field. Baggesen, already mentioned as formerly the
head of the Danish Parliamnent, had left Denmark a little
before Oehlenschläger, with the deliberate intention, although
in his opinion not quite practical, of never returning to the
country, and of never writing another 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, commenced a
series of critical onslaughts on Oehlenschläger, in
which the animus was painfully apparent. The public
became disgusted, Baggesen found himself in general dis-
avour, again expatriated himself, and finally died abroad.
It must however be owned, that Oehlenschläger stood in
need of a little criticism not too indulgent, and that he wrote
better after these attacks than he did at the time they
\commenced. In 1816 he made a second foreign tour to
Germany and to France, still using his pen when he halted, but
was driven home by severe sickness after a twelvemonth.
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 in one
consecutive whole all the scattered legends of the
Danish. The work was generally successful; and the most
of the work into English verse of very considerable merit by W.
E. Frye was published at Paris in 1845, and the poem
supplies much of the material for Pigot's 'Manual of North-
eerm' (published 1832), in which the same title was
written originally in German, was, on the contrary, of an
unmistakably inferior character. Oehlenschläger, who at the
age of seven-and-thirty took lessons in English from Andersen
Feldborg, a Dane long settled in Edinburgh, and well known
to Walter 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
efforts that Mr. Gillies made to overcome his inability to find a publisher who would pay 100l. to the
author and translator for copyright. The failure was a for-
tunate one for the fame of Oehlenschläger, 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
reading my poetical works. It embittered him to get into conversation
with strangers, and particularly with students on the bench
at the hill at Frederiksberg, and lead the conversation to
bear on me; when, if they said anything in my praise, it
tickled him much more than if they had spoken differently.
Many good-natured people were aware 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
Oehlenschläger'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
tiklange it was a sudden shock to the poet, and greeted his
sight over the waves from his earliest childhood at Frederiksberg, he had lived half a century, and been to
to Rome, without ever passing the straits. A brilliant reception
awaited him from all ranks in Sweden; addresses were pre-
vented to him at Stockholm, at Upsala, at Tornby, and even met him in a body in the high road with a professor at their
head. He attended the ceremony of the inauguration of a
rector of the university at the cathedral of Lund in company of
Tegner, whom he had met in Copenhagen by all as the first poet of Sweden, and was by many con-
idered to have surpassed in his 'Frithiof' any single work of
Oehlenschläger's. Tegner, in the course of the delivery of a
poetical address in hexameters, suddenly pronounced the
lines:

"Eklernemus Adam är bär, den Nordiske Kongerigets
Throneinviden int Diktingens verld ty Thomes o Goeboes.
(Adam of poets is here, the northern monarch of minstrels,
Hair of the componed Song, for now the seamstress in
Copenhagen, and in the presence of the crown that filled the
cathedral among whom were Oehlenschläger's wife and children, placed a
laurel crown on his head, amidst a bust of music and
the roar of cannon. The event, from all its circumstances,
assumed almost a national significance. Tegner and some
other eminent poets and persons appeared in person coming to Copenh-
agen. A few days after the King of Sweden sent the Order
of the North Star to Oehlenschläger.

Honours continued to shower on him after this; one of
which, the gift of a free lodging by the king, seems however to
ever have been availed of; "by a letter of King
Christian VIII," he tells us, "I granted me permission to live for
one summer in the house of the castle steward at Frede-
ricksberg," (the house which had been the official residence
of his father). "I wished very much to get the permission
tended to more summers than one. When I thanked 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
if I could hope to gather some of the fruit afterwards. The
king said that if it were practicable I should have permission
to live there; and I then told him, in the lively tone in
which I have so much practised, if 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, Oehlenschläger was
repeatedly invited to court by Louis-Philippe, and presented
on one occasion to a gentleman, whom he afterwards found to be
King Leopold, who told him he had read all his works in
German, and invited him to Brussels. A visit which he
soon paid to Norway, and another in 1847 to Copenhagen,
were the triumphal progress of a sovereign in literature. On
his sixty-seventh birthday 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
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. The young Danish poet, Oschilinshlager, wrote a poem on the occasion of his father's death, and it is said that he sent a copy of it to the poet, with a note saying, "I am sorry for you, cousin, but I am too lazy to write you a letter."

In little more than two months he was destined to die, and there was a general feeling of sorrow. The poet died on a Sunday evening, and his funeral took place on the following day. The funeral procession was a magnificent one, with musicians and military bands. The poet was buried in the cemetery of the town, and a monument was erected to his memory.

End of the passage.

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In the general character of Oehlenschläger, as shown in his life, it may be seen that a high estimation of himself was not his occupation; but this in his case, as in many others, was grounded on real merit. The tone of his 'Autobiography,' not unfrequently reminds the English reader of that of Hogg, the 'Ettrick Shepherd.' Neither of the two was of the world; both were 'under the sky,' not of the world; both were respected by their countrymen, who by their conduct did no less honour to themselves than to the poets.
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 exercises determined and similar impressions 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 prizes worth 360 francs.

In 1809 he wrote a 'Manual of Mechanical Physics,' a second edition of which was published in 1844. The relations and effects of his discoveries are now found in many departments of natural philosophy, scarcely any 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 metal aluminium in alums, and made other chemical discoveries. In 1828-23 he again visited Germany and France, and also visited England. On his return to Denmark he founded the Society for the Distribution of Natural Science, one object of which was to send forth 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 Scandinavonian Society of Natural History, and was president of it from 1842 to 1856. The Society of Natural Science, assembles 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 made a freeman of the City of London in 1852, and 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 1867 he was made Knight of the Garter, and in 1849 Knight of the Prussian Order of 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 took a deep interest in the progress of Danish literature. He was a constant reader 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 universities, but for many years to large and small gatherings in the university to citizens and classes of ladies. 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 the 9th of November 1820 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 Frederiksberg, near Copenhagen. He lectured through the winter, but the following March he took a severe cold, which terminated in inflammation of the lungs. He expired on the 9th of May. The following is a biographical 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 also. OERSTEDT, J. [Minneapolis, S. 1.]

OFR TAGEND. [Bot.: ostrida.] OFFENCES AND PUNISHMENTS. The punishments under the criminal law had been greatly mitigated prior to the year 1814. The sentences of death were still more from the establishment of an effective police in 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 not decreased. The number of persons committing crimes without violence: Class 1, offences against the person; 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, offences relating to the public revenue; 7, relating to the hireling classes, of which in 1850 there were 20,781 commitments, of which 20,162 were under class 1, 1354 under class 2, 15,478 under class 3, 1386 under class 4, 366 under class 5, and 1539 under class 6. In 1849 the number of commitments of which 20,623 were sentenced to capital punishment, and 34 executed of whom 21 were for murder. In 1840 there were 27,187 commitments, of which 21,484 were under class 3, and 19,473 convictions; of these 77 were sentenced to capital punishments, 9 of whom were executed, all for murder. In 1845 there were 24,303 commitments, of which 19,506 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 26,515 commitments, of which 18,866 were under class 1, 20,192 under class 2, 21,533 under class 3, 236 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. In the preceding classes of which 4038 were under class 1, 2924 under class 2, 16,737 under class 3, 463 under class 4, 250 under class 5, and 7451 under class 6. Of the total 17,108 were convicted, of whom 17 were sentenced to capital punishment, and 8 convicted. In the preceding classes there were 11,192 were under class 1, 676 under class 2, 2150 under class 3, 49 under class 4, 170 under class 5, and 231 under class 6. Of the total, 3835 were convicted, of whom 3 were sentenced to capital punishment, and 2 executed. In 1856, the latest returns we have, there were in England 19,437 persons committed for trial, of whom 15,425 were males and 4013 females; of these, 4672 were acquitted or discharged and 31 were found insane; of the number convicted, 1384 were for offences against the person, 16,015 for offences against property with violence, 10,487 for offences against property without violence, 94 for malicious offences against property, 707 for forgery and offences against the currency, and 345 for offences against the public revenue. In the preceding classes and including misdemeanors; 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 one month to one year; and 417 were sentenced to penal imprisonment from one month and under to not exceeding four years; and in this class, in the terms betwixt six months and one month or less, the numbers show a remarkable decrease from previous years; in 1850, the numbers were 7860, against 12,330 in 1849. In 1850, 16.500 in England and Wales, and 77 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 11,275, and under the Juvenile Offenders' Act, 2031. Altogether therefore there were committed in the year 1850, of whom were males and 33,363 females. The commitments were—19,278 for trial, 77,712 on summary convictions, 3794 for want of sureties, 15,052 remanded and discharged, 11,406 forScottish civil process, and 75,577 under the Mutiny Act. The total shows an increase of nearly 4000 commitments over those of 1855; but there is a decrease of 7000 in the number of summary convictions. Of the committals, omitting debtors and military prisoners, which reduce the number of cases to be considered to about 15,200 in the age; 11,991 of persons between 12 and 16; 24,886 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; 6272 above 60; and 370 of whom the age was notcertified. Of these, 27,574 were convicted; of whom 12 could not write, 61,253 could read or write and imperfectly, 6108 could read and write well, 318 had received superior instruction, and of 4371 the instruction was not ascertained. The county and borough prisons are stated to be occupied to
contain 25,447 prisoners; the daily average of prisoners is 17,764, and the greatest number at one time was 23,026: but, though the margin there may be room enough, some prisons are terribly overcrowded.

In Ireland in 1856 the total number of persons committed or held to bail for trial was 7008, of whom 3076 were either acquitted or discharged. There were 2924 persons for offences against the person, 556 for offences against property with violence, 2694 for offences against property without violence, 78 for malicious offences against property, 75 for forgery and offences against the currency, and 1143 for other miscellaneous crimes. Of those persons 50 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; for 588 the whipping or discharging of the ears were prescribed; and 2035 were discharged on conviction. In the same year there were 25,461 cases heard at petty sessions or before magistrates, and 3959 persons were imprisoned for drunkenness.

In Scotland in 1856 the total number of offenders committed for trial was 3713. Of these 1046 were for offences against the person, 380 for offences against property committed with violence, 1942 for offences against property without violence, 79 for malicious offences against property, 85 for forgery and offences against the currency, and 611 others for miscellaneous crimes. Of the total number committed, 2723 were convicted, of whom 3 were sentenced to death and executed, 274 sentenced to various periods of transportation and penal servitude, 2170 to various terms of imprisonment, and 355 were discharged on conviction or discharge on conditions of good behaviour.

ODIUM, a genus of Plants belonging to the order of the Fungi, some of the species of which are found upon the human body and other animals. It is known by possessing a simple or branched mycelium, which is very minute and pellicular, aggregated into distinct masses slightly interwoven and articulated. The sporidia are simple and pellicular, and arise from the joint of the mycelium.

O. albicans, the Thrush-Fungus, is found in the mucous membrane of the mouth, fauces, and oesophagus of sucking children, and also occasionally in grown-up persons in a state of extreme exhaustion. The ulcerations, 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 the change of the mucous membrane.

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 acid is that which will be found in the fruits of the Végetaux Parasites. Several other species of Oidium have been described. The fungus found in connection with the recent grape-vine disease is an Oidium. [Entophita, &c.]

OIL-PLUM. [ELMIA.]

OIL-TREE. [BARRIA.]

OILS. The Fixed Oils are mostly products of animal organization, in the fat and adipose tissues; 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, the hydrocarbon called Iparin. The Volatile Oils are mostly products of vegetable organization, and are so called on account of the ready manner in which they are volatileized by heat. Plants owe their peculiar odours to the 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 oxygen also, as oil of cloves; and those which contain sulphur, as oil of garlic.

OKE, LORENZ, a celebrated Swiss naturalist, was born at Offenberg on the 2nd of August 1779. He studied medicine and natural history at Göttingen, and held the position of privat-doctor in that university. In 1807 he became extraordinary professor of chemistry in the university of Jena; thence he removed to Zürich, and afterwards to Karlsruhe, where he died. Oken was 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 men, and the doctrines of nature and science, as well as of tradition in medicine, had applied the principles of the transcendental philosophy to the facts of the natural world, and by a process of thought endeavoured to give an explanation to the phenomena of nature. It was in this atmosphere that Oken had learned and preserved the true transcendental philosophy more or less guided his researches as a naturalist throughout his long life. His first work was published in 1809, and was entitled 'Elements of Natural Philosophy, the Theory of the Senses, and the Classification of Animals.' Another work by him, by the title of 'On Generation,' was published in 1805. In these works he endeavoured to apply a general theory of nature to the facts presented by the forms and the development of animals. In his classification of the invertebrates he included all the classes of animals, making each class of animals to represent an organ of sense. In his work 'On Generation' he first suggested that all animals are built up of vesicles or cells. In 1806 he published his 'Contributions to Comparative Anatomy and Physiology,' and pointed out the origin of the intestines in the umbilical 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 also observed the own phenomena of the crossing of a straight before me, at my feet, lay a most beautiful bleached skull of a hind. I picked it up, turned it round, regarded it intensely: the thing was done. 'It is a vertebral column!' He then referred back to his previous work and was whirling in its description of the vertebrae before mentioned, 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 Oken, Geoffroy 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 in the Harz, that Oken has earned for himself the title of "the father of morphological science."

While still a young man and deeply convinced of the importance of an ideal philosophy in explaining the phenomena of the external world, he wrote his 'Lehrbuch der Natur-Philosophie.' This work was published in 1809, and having gone through three editions, it was translated into English by Mr. Faulke, and published in 1847, by the Ray Society, with the title 'Elements of Physio-Philosophy.' In this work the author takes the whole field of natural science, and classifies the mineral, vegetable, and animal kingdoms according to his philosophical views. The transcendental philosophy has never been popular in England, and had it been published in this country it would have been despised. The transcendental philosophy, by the way, is generally held to be the most logical of all the forms of philosophy. The transcendental philosophy, by the way, is generally held to be the most logical of all the forms of philosophy. Moreover, in systems 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 the translation, and wrote a preface to the English edition. Of 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 unceasingly contributed to the literature of natural history. In the year 1817, he started a natural devotion in Aachen, and continued it 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 gathered together men who aspired to form one large body of the natural history of Europe has imitated this example with great and increasing success. Oken died full of years and honour, at Zürich, in August 1847. After his death his son, Carl Oken, was also a naturalist.

OLD RED-SANDSTONE. The following table and account of the Old Red-Sandstone Formation is given by Professor Austed in his 'Elementary Geology':—
by this formation; and its vast thickness is well displayed in the hills crossed by the new road from Leominster to Hereford. In the northern portion of the range, and near the mouth of the Towey and the parishes of Westmorland, 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 and sandstone, and finally the conglomerate and calcareous sandstone, are in some places distinctly stratified, and in others having a more irregular composition, yielding unequally to the weather, and exhibiting a brecciated aspect. It contains masses of chert exceedingly hard, and these, from the manner in which they are incorporated in the rock, appear to have been of contemporaneous origin. The bed is very indurated, and is very persistent, being found both in Moray and in Fife, 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 Gray-Sandstone of Balradder, where the lower beds are absent. It is represented as consisting, for the most part, of rocks of a bluish-gray color, sometimes, as at Balradder, resembling the silurian mudstones, at others forming a hard fissile flagstone exported as a paving-stone, and occasionally appearing in beds of friable stratified clay, easily washed away by the sea. The colour however throughout is gray, and in this respect differs essentially from the English-marl and contemporaneous beds, which are chiefly red and green marls.

The base of the whole system is represented by Mr. Miller as consisting of an extensive and thick conglomerate rising into a lofty mountain-chain in the county of Caithness, and containing 3000 feet of granite, while in the Morayshire, but a great thickness of arenaceous strata, containing conglomerates of various magnitude, intervenes between these and the middle beds.

The Devonian Beds present a series so distinct that no relations of mineral or mechanical condition can be traced between them and the Old Red-Sandstones. The upper beds on which the culms of Devonshire repose, consist of coarse red flags and slates, sometimes alternating with or superimposed on others of like kind; and while the English beds are to be sought among the calcareous slates of Cornwall and South Devon, the calcareous slates are occasionally fossiliferous, and are based upon an impure limestone. The Plymouth limestone in the south, and a group of coarse arenaceous beds in the north of Devon, together with the general series of Cornish rocks, are all included among these calcareous slates. Throughout the whole series fossils occur, but they are very unequally distributed, being locally abundant, and almost without trace in others. The calcareous character of many of the beds are sometimes much altered, and frequently obliterated. (Anecd.)

The Old Red-Sandstone is largely developed in Ireland, and it is peculiarly interesting as presenting all those parts of the series which are found in the central and southern parts of England. This formation is well represented in Ireland by a series of beds consisting of 1500 feet of strata. They are principally composed of a yellowish-sandstone alternating with shale and calcareous beds.

The Devonian or Old Red-Sandstones of Russia occupy a tract nearly as large as the whole of the British Islands. They rest conformably upon low plateaux of silurian rocks, and attain a height of from 600 to 900 feet above the sea level. This formation is repeated with nearly the same mineral characters and organic remains in America. It is found in both North and South America.

The following are the genera of the Invertebrate Fossils found in the Devonian Group, as given by Mr. Tennant in his 'Stratigraphical List of British Fossils':—

**Amphora.**

- *Manum erioborum*, Goldf.;
- *Scyphia turbinata*, Goldf.;
- *Amphipus tortuosus*, Phil.;
- *Astarta Blainv.,* 3 species;
- *Aulopora conglomera*, Goldf.;
- *Canemophora ramosa*, Phil.;
- *Canemophora rotunda*, Phil.;
- *Cystophyllum*, 2 species;
- *Cystophyllum*, 2 species;
- *Cystophyllum*, 2 species;
- *Fea's*, 4 species;
- *Fea's*, 4 species;
- *Glaucosoma bipinnata*, Phil.;
- *Glaucosoma bipinnata*, Phil.;
- *Glaucosoma bipinnata*, Phil.;
- *Glaucosoma bipinnata*, Phil.;
- *Glaucosoma bipinnata*, Phil.;
- *Glaucosoma bipinnata*, Phil.;
Echinodermata.

Adelocrinus hystricus, Phil.  
Cystocrinus, 8 species.  
Tetrametra ulvae, Goldf.  
Cystocrinus, 2 species.  
Platycrinus, 2 species.  
Tessuitocrinus macrodactylus,  
Petriotretus costulatus, Goldf.  
Corbula Hennahali, Sow.  
Oenocidaris, 7 species.  
Cyphoidea, 3 species.  
Megaster, 8 species.  
Morida, 3 species.  
Conchylii Monomorpha.  
Avicula, 9 species.  
Pecten, 8 species.  
Brachiopoda.  
Arctica, 19 species.  
Cuculeus sandallina, Lam.  
Cheopis, 3 species.  
Leptana, 7 species.  
Orthis, 16 species.  
Rostropoda.  
Acroclia specialis, Phil.  
Buccinum, 4 species.  
Eocyclus, 3 species.  
Nerita, 2 species.  
Natica, 2 species.  
Pleuronecia, 2 species.  
Scripionella, 3 species.  
Terobratala, 31 species.  
Gasteropoda.  
O. sagitata, (Sipus Loligo, Linnaeus), with an elongated body; peduncles of tentacular arms without suckers; extremities of their clubs armed with numerous sharp spines.  
This species is very rare on the British coast, but Morris, Forbes and Hanley record two instances of its recent capture.  
0. dornata (Loligo sagitata, Lam.), Delle Chiaje.  
It has an elongated body, and the peduncles of the tentacular provided with suckers throughout their length.  
This squid is often called in British catalogues "Loligo sagitata," but 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. bubula (Ball), has a short body; suckers confined to the clubs of the tentacles, minute, and 4-ranked on 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.

OMPHALEA, a genus of Plants belonging to the natural order Euphorbiaceae. The seeds of one of the species are said to be estable when the embryo is extracted, but if this is not done, they are too cathomic 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 Cob-nut or Hog-nut in Jamaica. Other euphorbiaceus seeds have the same properties.

O. triandra is a Guayana plant with a white juice, which turns black on drying, and is then used as ink.

OLDCASTLE. [Meath.]

OOLEANDER. [NYRIUM. S. 1.]

OLLEGON SPAR. [MINERALOY. S. 1.]

OLEIN. [TISUEES, ORGANIC, S. 1.]

OLIGOCLOACE. [MINERALOY, S. 1.]

OLIVENITE. [MINERALOY, S. 1.]

OLLERTON. [NOTTINGHAMSHIRE.]

OLNEY. [BUCKINGHAMIHSI.

OMAGH. [TYRONE.]

OMALISIUS. [LAMPRID.]

OMMADFEPH. [WEST MIDLANDS.]

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 exhibited in 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 dismantled, and forms a complete passage into the underlying clay.

Above the coarse limestones of the lower part, which usually consist of alternate hard and soft layers to a thickness...
of 50 or 60 feet, there are three beds of serviceable stone, interspersed with clayey or siliceous 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 substance, containing much earthy lignite. This bed, called the "weathered bed," is a very thin bed, and is a feature that some distant period nourished the roots of trees, fragments of whose stems are now found 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 over a distance of so many miles, shows that the change from dry land to the state of a fresh-water lake or marsh (which the nature of the overlying rock proves to have succeeded the period of dry land) was not accompanied by any violent destruction. They are sometimes seen,north-east, together with the trees which lay prostrate on its surface, must inevitably have been swept away had any such violent cataclysm then taken place.

The Upper Oolites consist of a blue, slaty, or greyish-yellow color. It frequently contains a considerable quantity of silenite, or "crystallised sulphate of lime. It usually effervescences with acids, and exhibits in tolerable abundance both vegetable and animal impressions, although its fossils are rarely in such good condition as to be preserveable in a 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, Kimberidge Clay, has been applied to it because it is well exhibited at Kimberidge 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 Kimberidge Coal. There are many beds of lignite found in the Oolites, but these are perhaps the most remarkable, next to those of the lowest Oolite deposits of Yorkshire and Northumberland.

Among the foreign rocks of this part of the oolitic period are, the Calcaire de Blangy, on the coast of Normandy; 2nd, the upper beds of the Jura, in Switzerland; and 3rd, the Gotland beds.

On the banks 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 met with also 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 calcareous grits, often more or less intermixed with corals, and containing thin lamine of clay sometimes passing into irregular bands of hard and tough marly rock. This calcareous matter seems entirely due to the presence of crushed and decomposed organic remains.

The thick-bedded limestones of the towns of Calne and Steeple Ashton, and in the surrounding neighbourhood, the coals of the Coral-Rag are found in greatest abundance and perfection; and this part of our island, at the time of the deposit, has clearly existed in the condition of a coral lagoon, of which the beds of hard limestone, about 40 feet; large portions of it are frequently made up of the remains of a single species, and an earthy calcareous free-stone, sometimes used as a building-stone, and full of fragments of shells, rests immediately upon it, and is surrounded by a fine-grained ferruginous 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 calcareous sandstone, containing corals, and of the name of Maltese, in Yorkshire), including a considerable proportion of the fossil remains of shells, both bivalves and univalves. The bed never loses its coralline character, and may perhaps be considered an imperfect coral reef, one extending from the south-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 Cambridge and Lincoln, which appear to be partly caused by the union of this bed with the Kimberidge Clay, producing a wide expansion 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-blue 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 preserved in the clay itself, but more frequently form a nucleus, about which iron pyrites have aggregated. Those preserved in the clay have been generally found in a very rotten condition.

The Lower Oolites admit of considerable subdivision in the British Islands, but the details seem to be rather of 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 rubble stone, tough and occasionally crystalline.

2. The Forest Marble, which consists of carbonate of lime, has been extensively quarried.

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 argillaceous matter, and including thin slabs of brownish limestones.

5. The Great Oolite is separated from the next bed, containing amongst them the clay used in the manufacture of cloth under the name of Fuller's Earth, and also a thin calcareous flag (the so-called "Blythefield Slate.") This latter has long been known as "Oolite" is remarkable for containing the remains of Marsupiata Animals. [MARSUPIATA.]

6. The Inferior Oolite is the last of the series of oolitic limestones. It is employed to a great extent as a building-stone. Its representative in France is the Caen Limestone.

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 Whitby, and on the Yorkshire coast, and it attains there a considerable thickness. It consists of three distinct parts: the lowest division including soft shales, extremely fossiliferous, which are separated from the uppermost series, also composed of incoherent clay beds, by an intermediate stratum of hard shale, about 30 feet thick, containing a quantity of the mineral called jet, and also occasionally large fragments of the bituminised wood of coniferous trees. The jet itself is but a peculiar form of carbon, and there can be little doubt that it is to be traced both on the coast of Yorkshire and at Lyme Regis, that there have been found the most remarkable and interesting of those fossil remains of extinct animals, for which the formation is so celebrated. The presence of alternate beds of limestone and soft shale is usually characteristic of the lias in the different parts of England where it is most developed. The dark bluish-grey colour, united with the singular riband-like structure, is more particularly remarkable in the upper beds of the formation, and is well seen..."
at Lyme Regis, Whitby, and Barrow-upon-Soar, in Leicester-
shire.

"The principal locality of the middle beds of the lias is the
neighbourhood of Cheltenham, where the marlstone of
Dumbleton Hill is crowded with interesting organic re-
manis. It is made up of alternating layers of coloured clays
and sandstones, 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 150
feet, and consists of sandy shales, of which the upper portions
are distinguished by the presence of several bands of gar-
lace-like 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 impure limestone bed and finely laminated shale,
in which are calcareous bands and concretions. These form
the base of the series, and gradient downwards to 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 marls of a light-blush
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, and these again by slaty marls of the upper series.
The Marls from 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
of these fossiliferous beds, especially the remains of trilobates,
but sometimes passing into a white micaceous sandstone, still
recognisable as the same bed. This bed was first observed
underlying a small patch of Lias, near the town of Ault
(situated on the left bank of the Severn, nearly opposite
the mouth of the Wye); but it has since been recognised at
Azmough, in Devonshire, and in other parts of England
further north, having a total range of upwards of 100 miles.
It is rarely more than 3 or 3 inches in thickness, but in
variously occupies the same geological position, and is for
the most part so exclusively composed of organic 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 underly-
ing 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
upper beds resemble those developed in England; the middle
however are usually more calcareous, and the lower sand-
y, and these latter, sometimes, as in Belgium, pass insen-
sibly into the upper New Red-Sandstone. The town of
Luxembourg is built upon a hard sandstone of this kind, and
these beds pass into the rock called Arkesite, a peculiar and
often metaliferous metamorphosed deposit, occurring where
the Lias sands come in contact with crystalline rocks. For-
siles 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. Eocercites are numerous and abundant, especially the
Pentacrinite, which attached itself to floating wood. Radi-
atid animals of other kinds characterise parts of the deposits,
and of these the Diadema is an example. Insects and Crust-
aceans have been frequently found. Star-Fishes are common
in the marls of England.

"Both univalve and bivalve shells of various kinds are
characteristic either of the whole deposit or of different beds.
The Spirifer is one of the latter species of a genus
represented far more abundantly in more ancient deposits,
while the Placogaster and Plagiogaster are among the ancient
representatives of more recent forms. The Pentamerus is an
example of a similar kind; and the Ammonites and Belemn-
ite, are essentially characteristic cephalopodous shells, infi-
nitely more common in the Lias, as it is the great part of the
oolean period. Above 170 species of Mol-
les have been described from the British localities only,
and of which as many as 70 are Ammonites.

"The most common in some parts of the Lias, and as many as 60 species in all have been described; of
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 ques-
tion 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 existed of genera
now common in distant parts of the world. The Flying
Reptile is a striking instance of the mammoth structure. The
swimming and indeed strictly marine monsters named Ichthy-
saurus and Plisontosaurus, are other examples." [Ptyco-
ductiy; Ichthyosaurus; Plisontosaurus.]

The following is a list of the Fossil Genera found in the
Oolitic Beds:—

**Planta.**

Alethopteryx, 2 species. *A. pseudopleura* Preal., *A. pleura* Preal.
Bemisia ocellata, Buck.
Brachyphylum mammillare, Lindl.
Butterflya squamosa, Brong.
Carpithecus, 2 species.
Cytophylax, 2 species.
Dictyophylum rugosum, Lindl.
Eucyclas, 2 species.
Lilia lanceolata, Buckm.
Lycoptera, 2 species.
Naiades, 2 species.
Neotrophus leonardus, Lindl.
Pachypteryx, 2 species.
Pectoptera, 11 species.
*Amphora.*

Spongocoma, 7 species. *Zoophyta.*

Alecto dichotoma, Lamx.
Aegonopsis cristata, Lamx.
Agarica lobata, Goldf.
Arctes, 3 species.
Carapx, 3 species.
Ceratopoda clavata, Goldf.
Corynosa, 2 species.
Crinipora, 2 species.
Eunomia radiata, Lamx.
Fungia orbiculus, Lamx.
Heteropora, 2 species.
Idomona triquetra, Phil.
Echinodermata. [Echinoderma.]

Arachnida.

Serpula, 17 species.
Vermicularia, 5 species.
Vermilux rubra, Sow.
Pollicps, 3 species.
Cirripedia.

Insecta. [Insecta, Fossil, S. 1.]

Crustataceae.

Acetes, 4 species.

Conchaferia Monomorqya.

Amphidusa, 3 species.
Anatina rudata, Sow.
ap. *A. antennata* Sow., sp.
Apicalia, 9 species.
Arata, 16 species.
Cardinica, 15 species.
Cardium, 15 species.
Cardina, 3 species.
Corbula, 4 species.
Curculites, 14 species.
Cyprinodex solida, Lycet.
Cythere, 2 species.
Gastropoda tortuosa, Sow.
Hippopotamium pousorum, Lutraria, 5 species.
Sow.
Leiocopa, 11 species.
Lepadinae, 4 species.
Lucina, 4 species.
The Fossil Cephalopods are numerous, and in the bygone ages of the world appeared to have been powerful instruments for keeping down the other tribes of ancient Testaceans, Crustaceans, and even Fishes: for many of them—
certain Orthoceras and Ammonites for example—afford every evidence of the most rapid dimensions. In the periods prior to the Chalk Formation, and at the time of its deposition, were the agents employed for this purpose, and were succeeded in the Tertiary period by the Fossil Trachelpoids, which are either entirely absent or very scarce in the Secondary and Transition series, while the Fossil Cephalopods occur but rarely in the Tertiary beds. The extinct Ammonites, Baculites, Belemnites, Hymenoptera, Tesnata, and Scaphites, will readily occur to the fossil zoologist as some of the most curious fossils of the period. The Foraminifera, formerly placed by D'Orbigny in this class, are now no longer regarded even as Mollusca. [FORAMINIFERA, S. 2.]

**Ophiocephalus** (from ὀφίς, a snake, and κεφαλή, head), a genus of Fishes belonging to the division of Acanthopterygii, characterized by having labyrinthiform pharyngeal, and capable of living for a long time out of the water. The species inhabit India and China. [AMBARAS, S. 1.]

**Ophiocoma**, a genus of Animals belonging to the order Echinodermata, to the family Ophiuridae, and to the tribe Ophioidei. The rays are simple, squamosous, not prolonged into the disc superiorly, and separate at their origins beneath by small quadrate plates. The species are called Brittle-Stars on account of their fragility. They are very difficult to preserve. Professor E. Forbes recommends their being placed in fresh-water as soon as 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 are the species found in the British Isles by Mr. Forbes in his *History of British Star-Fishes*:

**O. neglecta**, 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 small, 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. Balli**, Ball's Brittle-Star, was first discovered in Ireland by Dr. Ball.
"Tait's Magazine" in 1831. In 1834 she published the novel of Adeline Mowbray; or Mother and Daughter, in 3 vols., 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 1850 "Simple Tales," in 4 vols., were published, in which the author's principal theme is a螺丝ing, an artlessness 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 all-defined and often unconvincing, yet the "Raffian Boy" and "Murder will out" will always produce an 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 year "Bardo," a continuation of the careers which he prefixed a memoir. 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 vols., 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, the "Lying," appeared in 1825, and was dedicated to her father; they consist of short tales, made for her avowed purpose, with dissertations, and show more decidedly than any the great defect in her reasoning powers, though all evince the most precious intention.

Early in life Mrs. Opie had been intimate with the Quaker family of the Fryes, particularly with Mrs. Fry, and through them with the Gurneys. In 1814 a letter from J. J. Gurney appeared in which she expresses her mind on the subject, she commenced attending the Quaker meetings, and in 1825, with her father's consent, she formally joined their society. In 1826 her father died, but she continued to make Norwich her abiding place, varied by frequent visits to her friends, to Scotland, and to the South of England. She had been a member of the society she had joined, but did not give up her literary pursuits. She still wrote occasional poems, and in 1823 "Detraction Displayed" was published. In 1830 she visited Paris, and her old political feelings seem to have revived. She wrote some verses on the tricollar, 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 exertion 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 in her old feelings for some years, contributing occasionally, as she had done throughout her life, to cause her periodical works, 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 C. L. Brightwell, and published in 1855.

ORANGE, the Principality of, included the town and neighbourhood of Orange in the south of France. René de Nassau, nephew and successor of Philibert de Chillon, prince of Orange, was killed at the siege of St. Dizier in 1444, and left his heritage 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. The succession, however, was ceded to him by Louis XIV. at the peace of Utrecht. [Nassau, House of.] The principality then merged in the province of Dauphiné, and is now included in the Department of Vaucluse.

ORANGE TRIBE. [Avanttiaceae; Citrus.] ORCHIS, a genus of Plants the type of the natural order Orchidacea, and belonging to the tribe Orchideae. The old Linnaean genus Orchis is now divided into many genera [Cypripedium, etc.]; the number of species still retained under this designation. The tribe Orchideae is distinguished by the pollen grains being divisible into lobes, which are waxy and definite in number. The anthers are usually united, and the genus Orchis belongs to a section of this tribe, in which the pollen is united in a rosetting process between their bases. In Orchis the perianth is ribboned and hooded; the lip 3-lobed, spurred; the glands of the stamens 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
  motivation.
- 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, bivalved, and often with an intermediate tooth.
  ↑ Bracts with three or more nerves; root-knobs undivided.
- O. laevigata.
  ++ Bracts with three or more nerves; root-knobs palmat.
  ** Glands of the pollen-masses united; root-knobs undivided.
  ↑ Lip erect in motivation.
- O. pyramidalis, Pyramidal-Orchis.
  ↑ Lip spiral in motivation.
- O. hirincina, Lizard-Orchis.

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The valleys of the Clarnet and Umpqua rivers, while the main chain forms the valley of the Willamette. Other offsets, directing streams to the sea, turn down toward the Coast Mountains. This middle section of the state differs considerably from that west of the Cascade range. The hills are barren, but in the valleys of the Columbia, Willamette, and Siskiyou rivers the soil is generally fertile, and in some places even luxuriant. On the high plains of the Willamette Valley, and on the prairies of the Columbia and Siskiyou 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 these plains is from 1,000 to 2,000 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 International line. This, known as the Klamath, South Pass, occurs 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 far greater part rocky, barren, extremely variable in climate, and incapable of permanent settlement.

The principal river of Oregon is the Columbia, which forms the boundary of the state along the entire distance from the Umpqua Territory and Washington, and is not only common to both Territories, but receives all the rivers of both which rise east of the Cascade Mountains. [Columbia River.] The Siletz, Siskiyou, or Lewis River, sometimes called the Southern Fork of the Columbia, also contributes to the flow of the Columbia at the smaller branches which rise in the Rocky Mountains between 42° and 43° N. lat., and flows first west and then south through Oregon, passing into Washington near 117° W. long., after a very serpentine course of nearly 800 miles. The Siletz in its course through Oregon receives numerous affluents, all near or nearly all of which belong entirely to this Territory. Of these the principal are the Wapatoes, Siletz, and Siskiyou, on the right, and the Malheur on the left. Most of these rivers are navigable, and have considerable 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 the river nearly opposite to Fort Vancouver, 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 are all navigable, and have considerable value for navigation. The principal are the Umpqua and the Clarnet. The Umpqua, which, after the union of its two head branches, flows nearly west to the Pacific, into which it falls by Cape Gregory, about 43° 54' N. lat., is in its lower course a wide but deep river, forming the boundary of the Columbia on the north, and the waters of Oregon which fall into the Pacific, has its mouth obstructed by a sand bar. The Clarnet, 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 palaeozoic formations. Granitic, 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 south-eastern corner occur several soda and magnesia springs.

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 summer months, and occasionally severe in winter, while in the middle section the changes of temperature are much greater, and the winter much colder; but the air is more bracing, and the change of seasons is more marked. The climate in the north-eastern coast, 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.

Wheat 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. Potatoes are grown in the vicinity of the Columbia and Siskiyou rivers. The fruit 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 cattle and sheep, which are usually of the finest quality, and on the excellent pastures. Horses, horned cattle, sheep, and swine are already very numerous; and butter, cheese, and wool receive much attention from the agriculturists.

Oregon presents a great variety of land, but there is no deer, elk, antelope, or 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 in the rivers and the sea. The river4 swarms with fish, which form the chief 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 wood and lumber 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 unimportant, a considerable coasting trade being carried on with California; the exports consist 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.

Divisions. The Territory 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;—

Salem, 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 235, is one of the oldest American trading places in Oregon; however it is now but a small settlement, but its present increase is very slow. Milton City, Washington county, population 692, is one of the rising towns of Oregon. Oregon City, on the right bank of the Willamette River, 36 miles N.E. from Salem, population 692, is the chief town on the left side of the Willamette River, and 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 N. by E. from Salem, population 891, 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 representa

3  Q 2
ORTHAGORISCUS, a genus of Plectognathi fishes, belonging to the family Gymnotodontidae. On account of their round form the species are called Sun-Fishes. The genus has the following characters:—Jaws undivided, forming a cutting edge without teeth; mouth in a horizontal line, 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 described:—

O. mola, the short Sun-Fish, the Molebath, although only occasionally seen, has been taken around all the shores of Great Britain. When observed in our seas they have generally appeared as though they were dead or dying, and floating to the surface, fish in some distance, for a long time. The original name was derived from Colonel By, an officer of the Royal Engineers, to whom the British government in 1827 commissioned superintend the construction of the Rideau Canal. Byers in law was constituted a city, and the name was changed to Ottawa in 1826. Disagreement having arisen between the inhabitants of Canada West and Canada East respecting the seat of the Provincial Government, the matter was referred to the decision of Queen Victoria, who is stated to have selected Ottawa as the capital of the United Province 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.

Ottawa is situated at the entrance of the Rideau River into the Ottawa, 87 miles W. from the confluence of the Ottawa with the St. Lawrence. At the western extremity of the city are the celebrated Cataracts, unsurpassed in America except by the Falls of Niagara. The city is in Canada West, but a suspension bridge erected by the Provincial Government just below the Chaudiere Falls spans the foaming mass of water, and unites Canada West with Canada East. 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 Engineers and Tories, crosses the Rideau, and separates them from the Ottawa, one of the two latter falls, by which 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 industries are flour and biscuit, the produce of which is sent chiefly to the north and west. The value of this property of 1855 was $3,000,000.

OUDE, according to the Manners and Customs of Hindustan, is bounded S. by Allahabad, N. by Nepaul, E. by Bahar, and W. by Delih. Its greatest length south-south-east to north-north-west is about 200 miles; its greatest breadth east by north west by south is about 150 miles. The area is estimated

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at 35,000 square miles. The population is estimated at 5,000,000.

Oude was formerly a souabh, or subordinate government, of the Mogul’s dominions. By various treaties between successive victors and the East India Company, Oude became one of the dependencies, stated in 1799 as a British possession with some nominal political control. In 1819 the reigning prince renounced his nominal allegiance to the Mogul, and assumed the title of King. On the 7th of February, 1856, the Marquis of Dalhousie, governor-general, announced by proclamation, that the British government had obtained the annexation of the kingdom of Oude to the British possessions in India. The King of Oude was granted an annual pension of twelve thousands of rupees (120,000/). Oude forms a portion of the plain of the Ganges. The general character of the country, with the capital city, Lucknow, are noticed under HINDUSTAN.

OUDINOT, 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 1783; but parental influence induced him to withdraw from the army four years after his entry. Twenty years later, the Revolution 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 Bisach against the Prussians, whom he repulsed with great loss. He was soon after appointed by the Convention to the command of the regiment of Picardy, left vacant by its former colonel, whom the Jacobins expected of the day had induced to emigrate. At daybreak on the 3rd of June, 1794, being still at a distant outpost, the Austrians, on great numbers upon his regiment; but he held his ground 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, and, spiriting himself, 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 Trévoux, and on the 7th of August 1794, capitulating a town, he led the advance of the army of the Rhone, and was ordered to join the army of the Rhine-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. Released by exchange a few months later, he joined Moreau’s army in 1796, distinguished himself at the battles of Nordlingen and Donauwurth, captured several fortresses on the Danube, and was again most severely wounded at Ingolstadt. On the death of Duroc, 1797, he was appointed to the command of Conde before Constance, and penetrated into the town, in spite of a second corps of Austrians by which it was defended.

Austria 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 successfully passed through the English blockading fleet, bearing with him Massena’s despatches to Suchet. In 1800, as head of the staff under Brune, he obtained fresh honours at the battle of Pozzolo and the passage of the Minio. The First Consul was so highly satisfied with his efficient services, that he presented 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, which the command of which he intrusted to Oudinot, presenting him at 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 undermined and defiled, which became the passage of the Austrian common. General Oudinot was likewise present at Austerlitz.

The following year he took possession of the counties of Neufchâtel and Valengé, relinquished by Prussia; and during his government conducted the liberties and rights of his subjects. Before he left his office, the burghers of Neufchâtel eviscerated 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 Oströmla, February 6, 1807. The Emperor Napoleon now made him a count, to which he annexed a dotation of a million of francs. But the 14th of June 1807, the morning of Friedland, was the most signal of his life. On the famous ground, with his single corps, he checked for many hours the pass of the places by which the Austrians, after the sacrifice of half his men, enabled Napoleon to come up in one of his greatest battles. Meeting the general after the action, Napoleon said to him, with great emotion, you have done wonders but 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 sustained; 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 the whole of the eastern empire, and clandestinely left 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 tact, and adding to the credit of the Dutch people by his integrity and conciliatory behaviour.

Throughout the whole of the subsequent campaigns of 1812, 1813, and 1816, the name of Marshal Oudinot re-appears with the undiminished honour, as one of the best-trained and most efficient of the imperial band of generals. After the first incitement he submitted to the restored Bourbons, stedfastly adhered to their cause during the Hundred Days, and was loaded with favours by Louis XVIII. and Charles X. He was one of the prominent figures in Angoulême in his expedition for the re-establishment of the King of Spain. He was appointed governor of the Invalies in 1842, and died at Paris, September 27, 1847, in his eighty-second 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 1840 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, 1835.

OUTLAWRY. Outlawry, in civil suits, was of two kinds, that on mesne process, and that on final process. The former was an action brought by a plaintiff against a defendant who could not be served with a writ, and it was consequently always reversed on application to the Court, and the defendant appearing to the action. A simple method of giving a most effective judgment, enabling a plaintiff to obtain judgment by default when the defendant does not appear, having been provided by the Common Law Procedure Act, 1839, outlawry on mesne process is by that statute abolished. Outlawry on final process may still be obtained against 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.

OBEZ (Gray), a sub-tribe of the tribe Boreas and family Borelidae. 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. The females are often hornless. The skull is small, very deep, and cylindrical in section, and shows no significant lobes to the grinders. The hoofs are triangular, and being shallow behind, they have distinct interdigital fossae. Males emitting no bellow.

The genera included in this family are:

1. Ovs. Crumen distinct. Tail elongated. Skin covered with wool or adpressed hair.
2. Caprina. Crumen distinct. Tail very short. Skin covered with thick hair, covering the wool.


Ovis Arsia, 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 33 varieties of this species.

In the article Ssheep 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 which, like 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 Arsia.

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-Wooled Sheep.

2. The Common Sheep (Ovis rustica, Linn.; O. Gallicus, Deim.; O. brachyurus, Pallas; O. leptura, Schreb.); the Hornless Sheep (O. Anglicana, Linn.). Of this variety there are numerous forms, such as the Muga Sheep and Shetland Sheep, the Southdown Sheep, the Old Lincoln Sheep, the Romney Marsh Sheep, the Cobwold Sheep, the New Leicester Sheep, the Cheviot Sheep, the Old Teeswater Sheep, the Improved Teeswater Sheep, the Dumpy Sheep, the Zeland and Otway Sheep, the Welsh Mountain Sheep, the Soft-Wooled Sheep of Wales, the Wicklow Mountain Sheep, the Kerry Sheep, the Exmoor Sheep, the Black-Faced Sheep, the Black-Faced Heath-Sheep, and the Bass or Roohan (Ovis Foul, Blyth).

3. The Barwall Sheep, Ovis (Arsia) Bawrul, Hodgson; Ovis Barual, Hodgson; O. Amonoides, var. 1, Gray. It inhabits Nepal.

4. The Hunsia Sheep (Ovis Hunsia, Hodg.) The Hunsia or Black-Faced Sheep of Tibet. Also a native of Nepal.

5. The Cago (Ovis Cagia, Hodg.) The Kago, or Tame Sheep of Cabul region; the Cago Sheep of Gray. A native of Nepal.


7. The Curumbur Sheep of Mysoore.

8. The Sheep called Garah in India.

9. The Dukhan (Deccan) Sheep.

10. The West-Indias Sheep.

11. The Brazilian Sheep.

12. The Demerara Sheep.


16. The Guinea Sheep (Beller et Brebia des Indes, Buffon; O. A. Guineensis, Schreb.).

17. The Movran de la Chine, Buffon.

18. The Shyambular Sheep of Mysoore.

19. The Sheep of Zeyla, of Buckingham.

20. The Fantastic Sheep, of Bennett, from Tripoli.


25. The Zenn or Goitred Sheep (O. A. Zaltinum, H. Smith).

26. The Isalas (Isalas probostum, Ogilby; O. Salan, Sundevall).

27. The Cretan Sheep (O. Strepecarios, Ray; O. A. Strepecarios, Schreb. ; O. Creteos, Jous.; Capra Strepecarios, Brisson; Strepecarios Cretica, Beach; Beller et Brebia de Valachie, Buffon; Zachel of the Austrians; Wallachian Sheep of Bichtig).

28. The Long-Tailed Sheep of Russia (O. longicanecus, Brisson; O. Dolichura seu Proctoriaca, Pallas).

29. The Broad-Tailed Sheep (O. latiacaudas, Erx, Geoff.; Mem. Egypt; Lesson; Comp. Buffon; x. 321; O. latiacauda platyeroga s. Arabico, Linn.; O. Turcica, Charle; O. acauda obsca, Lindeli). It is a native of Barbary. There are several forms of this variety, of which the following are most prominent:—The Fat-Bumped Sheep (O. Strepecarios, Pallas; the forward Sheep of Bewick); the Persian Sheep (O. A. acauda, Geoff.); the Fat-Tailed Sheep (O. A. macacous, Schreb.); the Aera Fiyi, or Abyssinian Sheep; the

Bucharian Sheep (O. Bucharica, Pallas); the Tibetan Sheep (O. Tibetanus, Fischer); the Cape Sheep (O. Caprini, Erxleben); the Sheep of Belkah.

30. The Many-Horned Sheep (O. polyoxus, Linn.). It is called the Four-Horned Ram, and the Dumba Sheep.

31. The Puchis, or Hindustan Dumba (O. puchis, Hodgson).

32. The Short-Tailed Sheep (O. brachyurus bolealis, Pallas). It is a native of Northern Russia.

33. The Sheep of Tartary. They are said to eat bones like a dog.

The genus Caprae embraces the following species:

The Capra Ammon of Linnaeus, the Capra Murem of Brandt. It is a native of Armenia.

C. Murem, the Mouillon. This animal has a multitude of synonyms. It is the Capra Ammon of Linnaeus, and the Ovis Murion of Brandt. It is the Wild Sheep and Siberian Goat of Pennant. It is found in Cypress, Cadiia, and Cordia. For figure of Mouvion, see Suckir, p. 355.

C. Ammonorum, A. Trexelus, the Aouda of the Moors of Barbary and the Kebsh of the Albanian, is a native of North Africa. For figure, see Gogt, where it is named Jucrat.

C. Caspida, the Taye or Big Horn. It is the Ovis Montanus of Geoffroy; and a variety, the O. California, of Douglas. Dr. Gray says it is probably the same as the Ammon of Northern Siberia.

There is only one species of Pavoite, the P. Northor, the Naboer Nervate, or Sna. It is a native of Nepal.

C. Argalis, the Argali. It is the Ovis Argali of Pallas, and often confused with the former. It is a native of Siberia. Dr. Gray says of this species:—The Nyota or Rumbora, or Wild Sheep, seldom or never cross the Hemachal, the Indian side of which range is the special habitat of the Naoro, while to the north and west beyond Thibet our animal is replaced by other species, so that Thibet may be considered as the special habitat of one species (Ovis Amonoides), and the plateaux north of Thibet as far as the Altai of another (Ovis Ammon), cited as types of the true ovine 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 specimens received from Mr. Hodgson and those which were sent from Siberia by the Russian naturalist."

OVER. [CHESHIRE.]

OVERSEER. The duties of overseers have by recent statutes been extended and modified in various matters of detail; but the outline of their duties given under Overseers, vol. xvii, p. 70, is still sufficiently accurate, no alterations being of sufficient moment to call for comment.

OVERTON. [FLINTSHIRE.]

Paige, born July 24, 1822, 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 the results of their observations is published under the title of Dr. Overweg's Narrative of an Attack of fever, Sept. 20, 1862, at Madanari, about ten miles east from Kuka, and near the western shore of Lake Tchad.

PACINIAN CORPUSCLES. [TISSUES, ORGANIC, s. 1.]

PAGRUS. [PAECULL.]"
PALABRIS. [LARIBL.] Palaea. [CALTULIB.] Palæmon, Palæmonians. [SHREWS.]

Palm Tree Wine. [BORAG.] Palmblad, Wilhelm Fredrik, a Swedish writer of considerable talent, was born on the 18th of December 1788, at Ljusnedal, near Söderköping, the 11th child of a military commissary, who had procured the situation of Kronofogde, or collector of taxes. The property of the family was confiscated by the government, so that Palmblad, when a student at Upsal, and before attaining his majority, bought, in conjunction with another student, the university printing-office, and with it commenced a series of publications, which had for their object to effect a revolution in Sweden. His first name-day was celebrated by publishing a 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 'Postlak Kalender,' the earliest Swedish annual, and in the beginning of 1813 the first of the 'Svensk Litterat Tidning,' or 'Swedish Literary Gazette.'

The 'Tidning,' which lasted for eleven years—up to 1844—was the most long-lived Swedish literary periodical on record; while the Dans was published in 1824, boasting of one that had outlived a century. It circulation, we are told by Palmblad, was never upwards of 200, and averaged about 150; yet it had a great influence on the cultivation of Swedish literature. It excited the astonishment of the public by the audacity of its articles, and the freshness of its school in 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 university had then a Right to influence him, that, if in 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 more things held in utter abomination—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 'Swedish School,' was to bring the public to some knowledge of the masterpieces of Göthe and Schiller; and in spite of the efforts of the Academy, which in the first instance looked upon the Phosphorists as a body of uncontaminated rebels, the result was general though not local success. After 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 a stranger five years before. It is not certain whether the initiative in the new party was taken in the aspect of Swedish literature.

Palmblad, who was writing for the press, continued to contribute to the periodicals that successively arose on the ruins of each other, the 'Journal of the Swedish Literary Union,' the 'Svenska,' 'Skanda,' 'Mimer Frey,' &c., and also pursued an academic career. In 1839 he became 'Docent' or tutor of Swedish history at the university, in 1827 assistant professor of geography and history, and in 1838 professor of Greek. Many of his numerous works are on topics which occupied him as professor; his 'Handbook of Physical and Political Geography' (5 vols. Upsal 1826-37) is of high reputation, and has been translated from Swedish into German. His poetical translations of Sophocles (1841) and of Eschylus (1845) are of some note. When professor of Greek however he often felt an inclination to return to the early armament of writing novels, and his 'Falckenvärd Family,' (2 vols., Örebro, 1844-45), and 'Aurora Köningsmark' (6 vols., Örebro, 1846-51), met with much success, and were translated into German. The work however which has been most universal in its estimate and name is the great 'Biographical Dictionary of Celebrated Swedes,' which he left incomplete at his death, on the 29th of September 1863.

This dictionary, 'Biographiskt Lexicon 56er namnkunniga Svenska Män,' commenced in 1850, was interrupted at Professor Palmblad's death, but is now again in progress. The last volume we have seen is the twenty-second, which brings it as far as the alphabet of 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 as the Swedes possess, is that of Gesellius 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 compilations of Gesellius. Many of the lives are given at considerable length, several are autobiographies, as 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 no record of promotions; but such inequalities are of course unavoidable work of the kind. The book, less 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.
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. Paris devoted much attention to the study of the physical sciences, especially chemistry. 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 the bar from rusting and which it was found fired against the rock, and which by igniting the gunpowder used for 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 the great chemist, published posthumously, is considered to be one of the best pictures of his character. 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 Excerpts, S. 2.

PARONYCHIAE.E. Meiner's name for the family of Plants called by Lindley Knotwort. Brown named this tribe, under Necterum, Nectoreae, which is now most commonly adopted. [Encyclopedia.]
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 Hemisphere; to which is prefixed a Short Account of the most interesting Phenomena in the Science of Astronomy; 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 detained at the Bermudas, he did not reach England till 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 Buchanan and Lieutenant Ross in the *Italia*, 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 *Isabella*, under Commander 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 southwards, and on the 22nd arrived at the mouth of 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 steered southwards towards the *Isabella*. Parry was full of expectation, as were all the crew on board the Alexander, who, suddenly the Isabella tacked, turned her head eastwards, and rejoined the Alexander. Both vessels then retraced their course, and Lancaster Sound was left behind. Considerable ice had formed in the highland district that was named the Croker Mountains, barring the passage to the westward. The two vessels entered the Thames on their return in November of the same year.

Lieutenant Parry's opinion that there was an open passage 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 re- solved upon, the Hecla and Griper 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 Lieutenant Ross to the *Griper*; and Lord Melville placed under his orders in the *Griper*. The expedition left the Thames on the 11th of May 1819, and having sailed up the eastern side of Davis' Strait and Baffin's Bay, on the 21st of July they were in 73° 31' N. lat., nearly opposite to the entrance of the Croker Mountains, where they anchored, and lay in the westward 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 29th of July reached open water on the western side of the ice, passing through eighty 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 75° 1' N. lat. From this place to their return to London, which was the 26th of September, they received the reward of 5000L, offered by an order in council to such of 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 Melville Island, on its northern side, and from its vicinity described the high coast on the southern side, which he named Banks' Land, but which Sir Robert McClure has since ascertained to be the northern side of Banks's Island. He also discovered the Wellington Channel, and penetrated as far as 113° 54' 43" W. long. On the 30th 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 on the coast of the Queen's *New* Island. There the ships remained frozen up, with the sun entirely below the horizon from the 11th of November to the 7th of February, 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 in November 1820. On the 4th of the same month Lieutenant Parry was promoted to the rank of commander; and several other rewards and honours were conferred upon him. He published his Narrative of a Voyage for the Discovery of a North-West Passage, 4to, 1821, with maps and engravings, which was published by authority of the Lords Commissioners of the Admiralty.

Arrangements were 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 28th of May 1821. After having entered Hudson's Strait, 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, the ships were again frozen in on the 31st of October at the island of Igooolik, on the eastern end of Fury and Hecla Strait. There they remained till the middle of August 1823, when they commenced their voyage homewards, and entered the Thames on the 25th of November. Parry had been promoted to the rank of post-captain, November 6, 1821. His *Narrative of a Second Voyage for the Discovery of a North-West Passage, from the Atlantic to the Pacific, performed in the Years 1822-1825* was published in 1827, and was appointed Acting Hydrographer to the Admiralty.

The Hecla and Fury were soon afterwards retraced for another voyage, this time commanded by Captain Parry and the Fury by Captain H. P. Hopper. 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 22nd of March next following. The Fury was here wrecked, and the Hecla reached England, with a double ship's company, in the following October. Parry's *Narrative of a Third Voyage for the Discovery of a North-West Passage* was published, in 4to, in 1826.

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 1826. 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 Treurenberg Bay, on the north coast of Spitzbergen, on the 27th of July. Parry's plan was to reach the pole by an expedient route which had been prepared for the enterprise, left the ship, 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 remaining men were employed in the usual manner. This was the discharge of the Hecla. With excessive labour the boats were paddled through the water and dragged over the ice till they attained the latitude of 82° 43', which is the nearest point to the North Pole yet reached. Finding then that a current 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 31st of August, and arrived at London at the end of September. This expedition terminated Parry's arduous 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 1827* was published in 1828. He was appointed the deputy hydrographer by authority of the Duke of Clarence, then Lord High Admiral.

Captain Parry resumed his situation as hydrographer; but, as his health suffered considerably from close attention to business, he was appointed to the position of Secretary and Commissioner of the Australian Agricultural Company in 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 8th, 1829; he also was given the degree of Doctor of Laws, conferred on them by the University of Oxford. Sir Edward Parry sailed from the Thames for Australia on the 30th of July, and reached Sydney on the 13th of December. His
residence as commission 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 Assistant Commissioner of the Province of New Norfolk, 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. Resigning in which in the end of December 1837 he was Comptroller of Steam Machinery for the Royal Navy. 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 resignation of the incumbent, under the provisions of the Organic State of the 26th of February, 1833, which unites Poland to Russia, and for the next sixteen years carried out his plan of subjecting the country, one of the main points in the proposition of the invidious critics, but with his usual good fortune he was enabled to commence a deposition to 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-marshall in their respective armies. This was the culminating point of Paskevich's long career. When the recent war broke out between Russia and Turkey, the veteran was again summoned to the field, much, it is said, against his will. He planned the campaign against the Turks, which terminated disastrous for the Russians in the repulse of their attack on Silistria, and in that repulse Paskevich himself, had a narrow escape.

From this time he seems never to have thoroughly rallied, and after a long and tedious illness he expired at Warsaw on the 29th of January 1863.

Marashca, a young man, was married to a lady who was a relative of the poet Gribojev, 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 career in France was published by Tolstoy at Paris in 1855.

PASSER. [Sparrow.]

PASSIFLORA. E, Passion-Flowers, a natural order of Hypogynous Exogenous Plants. This order is included by Lindley in his alliance Fidaceae. It is characterised by possessing polypetalous or apetalous corollas; flowers hypogynous imbricated petals; stamens on the stalk of the ovary; simple terminal styles; arillated seeds; and stipitate leaves. The species are herbaceous plants or shrubs, usually climbing, very seldom erect.

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 parts called petals as a second row of sepal, have made the order classified under Chrysogonum; Pallas, regarding them as a second row of floral envelopes as petals, and made it poly- petalous. Lindley makes the affinities of this order with the genus Passiflora. [Passiflora.] Murensia ocelata, a West Indian Climber, is said to be ananthemis and diaphoretic. Besides the fruit of several species of Passiflora, the fruit of Tussilago farfara, T. tripartita, T. speciosa, and Paropsia adelisa are all of them edible. The species are principally found in South America. There are 10 genera and about 216 species.

PASSION-FLOWERS. [Passiflorae, S. 2.]

PATENT. [Yorkshire.]

PETERSEN. The name of Peterse, to Patents, has been greatly simplified and improved by the statute 15 & 16 Vict. c. 83, the fees payable for a patent have been reduced, and the payment of them spread over several years. One patent now suffices for the United Kingdom; and is no longer scoped as formerly from trifling inaccuracies in the specification, as these may now be disregarded. A Register of Patents has likewise been provided, in which claims, assignments, and licences must be recorded.

PATRICK, JOHN, 3 R 2.
then again assisted by Palm, proceeded to London and Oxford to prosecute his studies. On his return to Germany he was appointed in 1789 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 he first developed in his publication, "Die drei Briefe des Paulus," 1791, and "Clavis über den Jésus," 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, from 1802 to 1804, which was met with much approval 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 counsellor of the consistory and government. He retired from the political 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 Württemberg excited his attention, and in 1816 he commenced writing in a popular manner on constitutional and political questions, on his experience in dealing with important subjects, as well as on 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 theological writer he was deeply affected by the German Reformation, and his object was to defend against a once-sided nationality and a speculative deviation from the original doctrines of Christianity, as from mysticism and Jesuitism. With these ideas he began in 1828 a theological work, "Die drei Bücher der Derkter Danksprüche," 1829 to 1829, and another journal called "Kirchenbeleuchtungen," published in 1827. Among his other numerous writings we may mention 'Memorabilien,' published in parts from 1791 to 1793; "Sammlung der Merkwürdigsten Reisen in fremden Ländern," published in 4 parts, from 1800 to 1802; "Leben Jesu, als Grundlage einer reinen Geschichte des Urchristenthums," 2 vols. 1828; "Aufklärnde Beiträge zur Dogmen-, Kirchen- und Religions-Geschichte," 1830; "Exegetisches Handbuch über die drei Derkter Danksprüche," 2 vols., 1830 to 1833; "Skizzen aus meiner Bildungs- und Lebens-Geschichte, zum Andenken an sein fünfzigjähriges Jubiläum," 1839; and the "Vorlesungen Schelling’s über die "Offenbarung," 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 9th May 1849.

PAUKERISM. [Poor-law, S. 5.]

PECULIAR. The jurisdiction of all Royal and other Peculiars in the probate of Wills and the grant of Administrations has been transferred to the new Court of Probate. [P. 492.]

PECIDELLARIA, the name given by Müller to little pincer-shaped bodies found on the surface of many species of star-fishes and sea-urchins. When seen on the surface of the dried specimens they appear like little cleft spines. In Uroaster rudolphi, according to Dr. Sharp, 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 forcerole of calcareous matter. If animal happen to be alive between glass when the animal is alive, it is instantly grasped with considerable force. Those on the body and upper spines differ in shape from those on the spines immediately bordering the auras. When the star-fish is living the blades of the forceroles are in continual activity, but when cut off they seem to lose that power. These bodies have been observed by Sars in Echinus spharos, and he describes three species—

P. tridens, P. tripilus, and P. globifera.

The future of all species of the Echiurndormata under all circumstances, which would not be the case if they were parasitical animals.

3. The structure of the calcareous forceroles and stems to which they are attached, bear structurally a greater resemblance to the spines of the Echinodermata than to other structures.

3. The Pedicellaria 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.

4. Sars states that when a single Pedicellaria is irritated, the rest are inclined towards it.

Although Professor E. Forbes states that he was not able to confirm Sars in his observations, in two last points, he is nevertheless inclined to adopt the opinion that they were peculiar organs of the Echinodermata, rather than parasitical animals.

(P. E. Forbes, British Star-Fishes).

PEDILANTHUS, a genus of Plants belonging to the natural order Euphorbiaceae. It has a common slipper-shaped involucre. The male flowers several in the circumference. Pedicel bracteolate, each articulated with a naked anther. Female flowers one in the centre. Calyx wanting; style 1; stigmas 3; capsules 3-loculars.

P. tithymaloides, 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, usually with a low spreading branch, and may be hardy in the soft, weak, as thick as the finger; when old cinereous, when young green. The leaves are ovate, obtuse, or acute; coriaceous, entire, alternate, stalked, distichous, when young downy on each side, and vary at the edges, becoming as adult to entire, and more or less toothed, sessile, from 8 to 30. Prematurely set out against the extremities of the branches. Involucre slipper-shaped, bright-red with a green back. The practitioners of Curacao give a decoction of the whole plant, especially of the flowers, as an emmenagogue, and in large doses in some diseases. The root is emetic.

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, one of the most prosperous and valuable landowners in the Borough of Bury. His Ramsgate was his seat. He was educated at Eton, where he was active and influential, and at Cambridge, where he was graduated B.A. in 1806. Both at school and at the university he was distinguished by his talents, his kindness, and the solid perseverance of his character; 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 1806, at the age of twenty-one he was returned to the House of Commons as member for Caithness. 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 independence by an allowance out of his father’s income equal in amount to the fortunes of most a nobleman.

On entering Parliament Mr. Peel attached himself to the Tory party, to which his father already belonged. Peel was a very close friend of Lord Brougham, and Caithness was his most powerful conduit; while on the Whig benches sat Sheridan, Tierney, Whithread, 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 many of young man’s first steps in the walk of life for which he had been cosily trained, were looked at with much interest and with some jealousy. But Mr. Peel was prudent, and was in no haste to make a measure. "Time is money," and he was笃信 of his character. His first speech of any length was in January, 1810, when he 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 this, coupled with his youth, so far as he possessed as the son of a man of so much commercial influence, led to his appointment, in 1811, to the office of under-secretary for the colonies. It was the time of the Peninsular war, and the struggle against the Napoleonic power was formed a part; and as purely colonial questions were of comparatively small importance in the midst of events of so engaging a nature, Mr. Peel had not many opportunities of displaying his powers in his first office, whether as an administrator, as a member of the legislative council, or as a member of the cabinet, he never brought him a clear accession of parliamentary reputation.

The assassination of Mr. Percival on the 11th of May, 1819, occasioned the formation of a new Tory ministry.
The Earl of Liverpool became premier with Lord Castle-
reagh 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 the cabinet were Viscount Palmerston, 
secretary at war, 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 far from a pleasant one. How he had a share in 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 agitating out of his heart to drive them to that full 
force of the stormy period. The young secretary for Ireland 
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 
hatred to him personally. After 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. The angry feeling thus attributed by one party 
evident afterwards was that it was at that time that, though 
Mr. Peel opposed the claims of Roman Catholic emancipation, 
and backed the ministry with which he was connected 
throughout the whole of his tenure of office, the Irish 
government of Ireland were by no means those of the 
extreme Orange party. From his first entrance," says one 
of his biographers, "upon the tumultuous arena of Irish 
politics to the end of his life, he would, if he could, have 
quieted the flames; and even when, in the storm, he 
amid their fires, in the cooler element of practical and 
secular education; but this was far beyond his power. His 
encouragement of schools, where the strife of religious proselytism 
might be merged in the soberer pursuits of ordinary mental 
culture, was not only an indistinguishable one, and to 
infidelity by the other; and by the diligence alone 
with which he sought to remedy the multifaceted abuses 
and total want of order which existed in the details of his own 
office, did he discern in Ireland with either the care 
else, for his own party he was too temporising, for the 
emancipationists too exacting." To all intents and purposes 
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 ablest that he 
had yet delivered, and came as well to the side of 
denunciation. They were closely bounded with the desirables 
under the ground of essential principle, but strongly and skilfully 
laid hold of the points of real practical difficulty. The truth 
is that a mind so thoroughly good, English, and moderate as 
that of Lord Liverpool, who was not charged, in a subordinate capacity, with the management 
of Irish affairs at a time of such heat and frenzy. Accordingly, 
as soon as an opportunity offered, he vacated the Irish secre-
taryship. The war with Napoleon I. was at an end; 
Waterloo had brought peace; Europe had been re-arranged 
by the Treaty of Vienna; and the Liverpool-Casterlreagh 
ministry, with gradually increasing unpopularity, was 
addressing itself to the home-questions the discussion of which 
formed the leading topic of the day. In this way, the state 
was the state of affairs when Mr. Abbott, the Speaker of the 
House of Commons, having retired into the Upper House as 
Lord Colchester, and a vacancy having in consequence 
occurring in the representation of the University of Oxford, 
Mr. Peel was elected his successor (1818). Mr. Canning 
resigned 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, deter-
ned him from accepting. He was offered the chancellorship of 
Oxford, and the preference; it was a little to the damage of the government, already far 
from firm, resigned his post without accepting another. 
From 1838 till 1823 Mr. Peel had no official connection 
with the Liverpool-Casterlreagh ministry. He continued, 
surely, to be the sincere friend of the party which in 1821, 
consISTed of a remonstration signed of a counter remonstrance. 
In consequence. It was during this period, too, that by the 
lead, 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 Economist party, of which Mr. Horner during his life had been the head, and to 
which the House about this time received a powerful acces-
sion of Mr. David Ricardo; and on the appointment of a 
Committee to consider the question of a resumption of cash payments and other allied ques-
tions, rendered necessary by the commercial disturbances 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 
avowed himself in his speech in the debate on the 
Barnett, Haukisson, Frederick Robinson, and Sir James Mackin-
tosh. 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, in consideration of the collections of the 
cash-payments, he constituted himself the champion, to use 
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, through the whole range of human 
affairs." The same year took part with the Liverpool government in their opposition to the 
thenthen revived agitation for Parliamentary Reform. He 
approved of the famous "Six Acts;" and—what was long 
ago remembered by the other party to his discredit— 
fixed at all the damage of the new currency. Mr. Peel was 
not called upon to exhibit it by any official connection 
with government, the conduct of the magistracy in the 
called "Manchester massacre" of August 1819. He kept 
aloof however, with studious caution, from the ministerial 
connexion in the case of the Soho rioters, who found, in the 
denial of George III. and the accession of George IV. to 
the throne (January 29, 1830), and which were terminated 
by the queen's death in August, 1821. It was in the midst 
of this storm of ministrational politics that Mr. Peel began 
and married. His wife 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 Castlereagh, 
who was succeeded by Sir Francis Burdett. Till the fatal 
sickness of Lord Liverpool (April, 1827) brought 
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 
some differences on domestic politics. Mr. Peel, who was 
charged with the management 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 
unfavourable 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 threatened by a breach with Mr. Canning. Mr. Peel's 
party who stood opposed to the Roman Catholic claims, 
and of whom Mr. Peel was the active leader; and the more 
liberal party, who, with Canning as their leader, 
were approximating to the Whigs. The question, on 
Lord Liverpool's retirement, was the appointment of a 
imperial and an inestimable man, such as the 
Duke of Wellington, to succeed him, the two parties could 
be held together, or whether a new ministry should be 
constituted. There was a strong feeling that the issue 
was the alternative which actually came to pass. The king, 
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 
include the whole of the present government. The 
operation of the Test 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-
tonship of the Exchequer together with the premier's usual office of First Lord of the Treasury; and the blanks in 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 created Viscount Goderich); Mr. Robert Canning; Mr. John Copley (now Lord Lyndhurst) as Lord Chancellor (April 1827). [CANNING, GEORGE]

On Mr. Canning's death (Aug. 6, 1827), his anomalous ministry was dissolved with dispatch, and now came the Whig of the old school, Mr. Peel, into office, and the Whigs, was continued for a few months by Lord Goderich; 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 old office of Lord High Chancellor. This was 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 Chanceller, 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, Secretary of State for the India Office, Mr. Granville; President of the 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 Bill for the re-establishment of the Catholic Relief Bill in the Commons, as member for the close borough of Westbury. His speech on this occasion was not only powerful at the time, but is interesting now as revealing what was 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 next place I say that government must choose one of two courses. They must advance or they must recede. They must grant full political privileges to the Roman Catholics, or they must retract those already given. New light has been 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 argument 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 facts tend to 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, was passed—Mr. Peel, as Home Secretary, introduced other measures of importance. Long before the New Metropolitan Police Act, which provided London with its efficient body of 'Peelers,' subject to the Home Office, in lieu of the old 'Charles.' 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. In December 1830, Lord John Russell moved the question of disfranchising the unrepresentable boroughs, and transferring the representation to some of the large commercial towns then unrepresented. Mr. Peel opposed the measure, "because it introduced a principle into the system of representation which the country—Mr. Peel said was the ultra-democratic principle, and with which the aristocratic and monarchical principle could not long co-exist." The death of George IV, however (June 26, 1830), and the ascension 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-assembly of Parliament on the 2nd of November 1830, the Duke again represented the party in the Commons; but Mr. Peel, whose name was also not, was more guarded. Amidst violent excite-
ment, the ministers resigned; and a Reform ministry—the first Whig ministry since 1807—was constituted the same night. Lord Grey became Lord Chancellor; Lord Palmerston, Foreign Secretary; the Marquis of Lansdowne, President of the Council; Lord John Russell, Paymaster of the Forces; Lord Althorp, Chancellor of the Exchequer; and Mr. Peel was succeeded by Lord Grey in the office of First Lord of the Treasury. In this juncture that the death of Mr. Peel's father raised him to the baronetcy and the estates.

For the first time in his life Sir Robert Peel was now in open opposition. He opposed with great determination the Whig schemes of reform, but in such a manner as to indicate his private conviction, from an observation of public opinion, that some change in the representative system was inevitable. His conduct in fact, during the whole of the session of 1830-1, was calculated to increase that impression. He declined at the last moment to join with the Duke of Wellington in the attempt to form a ministry to supersede that of Earl Grey. The Duke of Wellington withdrew his opposition; on the 4th of June 1833 the Reform Bill passed, and on the 26th of the same month the first reformed Parliament met. Sir Robert Peel was returned for Tamworth, which he continued to represent during the rest of his life.

Acquiescing in the new state of things, and abandoning all idea of abridging the constitutional change which had occurred, it was now Sir Robert's aim to organise, what he called a 'Conservative' party, as distinct either from that of the Whigs, or that of the invertebrate Tories. Supported in his new scheme by the Duke of Wellington, and with the active co-operation of the Duke of Richmond, he took the same shape, he acted as a vigilant, but not factious, critic of the various important measures introduced by the Whigs into the Reformed Parliament; first, under the premiership of Earl Grey; and, next, under that of Lord Melbourne. He gave his support to the Irish Coercion Bill; he advocated the abolition of negro slavery in the colonies, but advised great caution in the practical steps for carrying it into effect; and he acted a cautious part in the debates on the Poor Law Amendment Act of 1834, but, on the whole, approved of that momentous change. These measures were carried while Earl Grey was still premier; but before the prorogation of Parliament in August, 1834, Lord Grey had been succeeded by Lord Melbourne, with Lord Althorp as his Secretary of State for Foreign Affairs. Lord Melbourne, Althorp's father, Earl Spencer, in November 1834, having raised him to the Upper House, the king, to the surprise of all, availed himself of the ministerial difficulty thus occasioned, and availed the Whig Ministers another, and call the Duke of Wellington to his councils. Sir Robert Peel had not expected any such event, was then at Rome with his family. Being sent for, however, he hastened back to London, where he arrived on the 9th of December; the Duke, who had, in the meantime, acted provisionally as minister, immediately consulted with him, and a Conservative Ministry was arranged as follows:—First Lord of the Treasury and Chancellor of the Exchequer, Sir Robert Peel; Lord Chancellor, Lord Lyndhurst; President of the Council, Lord John Russell; Secretary at War, Lord Grey; Secretary at Home, Lord Melbourne; Secretary of State for Foreign Affairs, Lord Althorp; Secretary of State for the Home Department, Lord Grey; Paymaster of the Forces, Sir E. Knatchbull; Secretary at War, Mr. Herries; Secretary for Ireland, Sir Henry HARDING.

Sir Robert Peel's administration was short. It began in December, 1834, and in April 1835 it was at an end. On assuming office, Sir Robert, in a letter to the electors of Tam-
worth, had made a manifesto of the intended policy of his administration, with regard to the Reform Bill. He said, "I will now repeat the declaration which I made when I entered the House of Commons as a member of the Reformed Parliament, that I consider the Reform Bill a final
and irrevocable settlement of a great constitutional question—a settlement which no friend to the peace and welfare of the country could have been insensible to the necessity of. 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 measures in want of change. The policy of the ministry, however, while it was not satisfactory to the remnant of the old Tories, was certainly not satisfactory to the country at large. The Reform Bill had not, indeed, produced all the results that Sir Robert Peel had anticipated; the expected increased activity of the public spirit had not taken place; the disbandment of the militia had not the popular expectation, and the disappointment had begun to show itself among the Radical party, which cried the Whigs severely and were bent on carrying farther constitutional changes. Still, the reaction against Whig rule was not as great as had been anticipated, and the Whigs were again beaten in the Commons by a majority of seven on a motion by Lord Melbourne for an amendment on the address. Sir Robert's speech on this occasion was extremely able. Singling out the fact that the strength of the opposition to his address was a band of Irish members with the Whigs, he adumbrated 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 defunct Whig ministry than he and the Conservatives had been, 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 Reform Bill had been passed. The amendment 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. Doublayle, was "that the Whigs would be more 'squeezeable' than the Conservatives"; and, accordingly, when the Whig ministry was formed, it was an 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, which was on various occasions which were intended. This was no option but to resign (April 8, 1832). Lord Melbourne 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 interior he had before had to do with the Whigs and Lord Brougham, so that the chancellorship 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 these 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 for ministers was so small, the numbers being 254 against 280, that the Whigs resigned on the following day (May 7, 1839), and 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 Lord Melbourne. Finally, on July 3, 1841, the War Office was transferred to the Whig party Sir Robert deemed inconsistent with their holding official place under a Conservative government. The Whigs accordingly resumed office, and kept it for more than two years longer. This government, before it was dissolved by 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 force of the opposition that an anti-Corn Law majority of 360 against 209 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 increasing specially their financial policy and their conduct in 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 ministry consisted of the following members:—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, Lord Stanley; President of the Board of Trade, Viscount Abercorn; Colonial Secretary, Lord Stanley; President of the India Board, Lord Ellenborough; Secretary at War, Sir Henry Hardinge; President of the Board of Trade, the Earl of Ripon; Chancellor of the Exchequer, Mr. Goulburn; Paymaster-General, Sir Edward Knatchbull. 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 149 and 2, about a half the members of the House of Commons, 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 at the opening of his ministry, he added one after another of corn duties over a fixed duty, and such other general avowals, 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 imperial measures, or involve himself 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 corn laws, he proposed to substitute (Feb. 9, 1842), 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., 12s. when wheat was at 60s., 8s. when wheat was at 65s., 5s. when wheat was at 70s., and only 1s. when wheat should be at 73s. or upwards. There was a corresponding scale for oats and another for barley. The measure, displacing as it did the scale system, was on various grounds, and Sir Robert himself, 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 stabilization at all. This was, however, rejected. After several motions against it on different principles had been 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 7,022,638l. which began the year 1842-43, it was calculated by anticipation at 2,570,000l. On this head, says Mr. Doublayle, Sir Robert argued that the maximum of indirect taxation was then reached, and that to accumulate the already unbearable load of imposts 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 he submitted a bill imposing a rate of 7s. in the pound on incomes of 100l., and a 1s. in the pound on incomes of 50l. and above; a tax of sevensnave in the pound, or nearly three per cent. 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 dye-woods; 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 colleagues, and the most of the debates on the measures of the debates upon it, it distinctly appeared that he was a convert to the theory of free-trade. "I believe," he said in his speech on the tariff, "that on the general principle of free-trade, there is now no great difference of opinion, and that all agree that by the system of free-trade we shall be in 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 ulterior 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 main bulk of the debates turned on the question of taxation and finance engrossed the parliament of 1842. The most important events of 1843 were extra-parliamentary. The permission of the disruption of the Scottish Established Church in May 1843 has been accounted by some a fortunate consequence of the efforts made in the House, and on the part of the citizens of conservation, and has been attributed to false or insufficient information on the part of the government. The contest with Mr. O'Connell, who was then agitating Ireland to be annexed or bought by France and the organised action of an association which had 'repeal' for its motto, occupied 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 go beyond 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.

Banking. The extraordinary activity in railways, 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 augmentation of the Exchequer, the grants to supporting six new Irish colleges, open to all sects, were carried by the government; and though the Anti-Corn-Law League, represented in the House by Messrs. Cobden and Bright, were making way, the danger of a general drift towards enacting the Corn Laws was not materially affected. But the events of the long recess of 1846 were of a kind to disturb all existing arrangements and all ordinary calculations. The potato rot, followed as it was by a dreadfully famine, was considered it, and this, it was hoped, would 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 take a hand in the matter. Sir Robert joined with Lord John in attempting to form a cabinet, Sir Robert was recalled after a few days, and re-accepted office at the head of his ministry (Lord Stanley seceding) with the avowed intention of repealing the Corn Laws. Accordingly, a meeting of the peers was called on the 12th of December, and 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 members of great influence, were among his 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 29, 1846). Before doing so he made a magnanimous declaration to the effect that the merit of the repeal of the Corn Laws was more due 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 applause as followed Sir Robert. 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 supporting their various measures. 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. Antipathies were general of his speedy return to power when, riding up Constitution-hill 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. Guisot's more recent Life of Sir Robert Peel, 2 vols., 1880. 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. Those who have been in correspondence with him have agreed in their general estimate of him as a man of high conscientiousness, 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 that, the eulogy of his technical and practical work, which 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 and one daughter, Sir John Peel (born May 4, 1829), formerly secretary of legation in Switzerland, and in 1857 a junior lord of the Admiralty, and who has represented Tamworth in parliament ever since his father's death; Frederick (born 1835) who also sat in parliament for several years; and had been secretary for the colonies from 1851 to 1857, with a short interruption; William (born 1834) a captain in the Royal Navy, who has greatly distinguished himself in the Crimean war and in India; John Floyd (born 1837) an officer in the Scots Fusilier Guards; Arthur Wellingay (born 1838) a captain; two daughters, one married (1841) Viscount Villiers, eldest son of Earl Jersey; the other married (1850) the Honourable Mr. Stonor.

PEERS OF THE REALM. In the case of Lord Lansdowne, who had been a member of the House of Commons from 1835 to 1847, and as a mark of the immensely increased feelings of his natural life, it was held (in the Session of 1855-56), that 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.

PEEL, Sir Robert, 2nd baronet, and 18th of the name, was created a peer of the realm for the British possessions in India, by proclamation of the Governor-General of India, dated June 20, 1853.

It includes the following districts:—

<table>
<thead>
<tr>
<th>District</th>
<th>Square Miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangoon</td>
<td>9,800</td>
<td>137,130</td>
</tr>
<tr>
<td>Pekin</td>
<td>6,550</td>
<td>128,189</td>
</tr>
<tr>
<td>Foochow</td>
<td>8,550</td>
<td>100,600</td>
</tr>
<tr>
<td>Hongkong</td>
<td>3,955</td>
<td>34,957</td>
</tr>
<tr>
<td>Toungoo</td>
<td>3,955</td>
<td>66,129</td>
</tr>
</tbody>
</table>

Total        | 32,900       | 570,190    |

PEKTLJITE. [MINERATOLOGY, S.1.]

PELAGONIC ACID. [CHEMISTRY, S.2.]

PELLICO, SILVIO, was born in 1789, at Saluzzo, in Piedmont. His father was Onorato Pellico, of a respectable family, and in good circumstances. His mother was a native of Giovine, Venetia, where she had just married. In addition to that of her husband, was called La Signora Pellico-Tournier. They had six children. Luigi and Gioseffina were the two eldest; Silvio and Rosina, twins, followed; Francesco and Marietta were next in succession; and finally Silvio and Claudia, the youngest. Silvio was the son of their parents. Onorato Pellico, while his children were yet young, having established a manufactory 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 by Luigi afterwards became a dramatic writer 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 the marriage was a happy one. Pellico-Tournier, with her son Silvio, 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. He tells of his first visit abroad ('The Lute') which 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 obtained a situation under the minister of war at 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 to France in 1810, and went to Milan to be instructed in the Collegio degli Orfani Militari, an occupation 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, with whom he afterwards corresponded. In 1812, a young lady named Piccardone, who resided at Verona. He was for a time tutor to the son of Count Biche, and afterwards to the two sons of Count Luigi Porro Lambertenghi, in whose mansion he was entertained with the most intellectual men 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 retreated to Italy, and in 1813 moved to Turin, where he again took an office under the government. Silvio Pellico continued to reside at Milan with Count Porro.

Silvio Pellico's first dramatic production was the tragedy of 'L'Amante Veneta,' which was followed by his tragedy of 'Rastacce da Rimini,' founded on well-known passages in the 5th canto of the 'Inferno' of Dante. This tragedy was much admired, was 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, 'Ennio da Messina;' but so many passages were objected to by the censorship that he sent it to Turin, where it attracted much attention. He afterwards removed to France and returned to Italy, and at last gained the consent of the government to publish it. In 1818 Silvio Pellico was the first man to establish a periodical entitled 'Il Conciliatore,' of which he became the editor. It was a kind of Catholic magazine, and with 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 revolutionary 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 he was tried at Venice, found guilty, and was sentenced to prison for a period of fifteen years of 'carcere duro.' In April 1832 he was removed to the prison of Spielberg, near the city of Brunn, in Moravia. Some of these sent to this prison are condemned to the 'carcere duro' (severe imprisonment), and some to 'carcere durissimo' (very severe imprisonment). Silvio Pellico says:—"Those condemned to 'carcere 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 'carcere durissimo' are chained together; and with a band 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 poorest of all: they have only bread and salt. Moreover, earlier part of his imprisonment, during about eighteen months, he was treated with indulgence by his jailer, and read the Bible, Homer in Greek, Dante, Petrarch, Shakspere, Byron, Scott, Schiller, Güthe, and other writers, and was allowed paper, pen and ink. His friendly jailer 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 was afterwards less stringent, and on the 1st of August 1830 he received the announcement that he was to be set at liberty. 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 Miei Prigioni," which was very circular, and has been 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 'Il Nove Tragedie,' which were 'Gismonda da Mandriva,' 'Leonci des Franchi;' 'Tommaso Moro;' 'Orseolo;' which was his tragedy of 'Tommaso Moro.' His mother died in 1837, his father in 1838, and his brother Luigi in 1841. In 1837 appeared his '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 Moncaglieri, near Turin, January 1, 1854.

PENNACEE, a small natural order of Perigynous Exogenous Plants. The plants are shrubs with unisexual inesepaled flowers. The flowers are apetalous, the ovary composed of four carpels, the calyx tubular. Lindley places this order in his Rhammal alliance, and points out its relations with the Thymelaeae and Anacardiaceae. The species are mostly native of the Cape of Good Hope. A scented sweetish nauseous gum-resin, called Sarcocoll, is produced by various species. This substance contains a peculiar principle called Sarcocollin, which is converted into oxalic acid by the addition of water. It links the family of the Capsidae with the Echinodermata. It includes the genera Polinos, Cucumaria, and Oenus.

Polinos (Forbes) has an irregular ovate body, armed with five rows of distant suckers, those below being always bent; tentacula ten; dental apparatus short, truncate; no gizzard.

P. brevis, of Forbes and Gooden, is the only species. It was discovered in the Shetland seas, adhering to the stems and leaves of the fleshy plant, 'Tetraedra'. It is about half an inch in length, of an ovate form, with both its extremities bent upwards. The body is pinkish-white, with minute papillae. The tentacula are long, pedunculated, and directed downwards. The movement is sluggish in its movements, but moves its tentacula freely. Cucumaria has the body regular, more or less pentagonal, with five longitudinal rows of approximate suckers; ten tentacula; dental apparatus composed of nearly square plates of the species are called Sea-Cucumbers. They are the most typical of the Holothuriaceae, 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 very long, and sometimes very short; and 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 British Star-Fishes':—

C. frondosa (Holothuria frondosa, Gunner), the Great Sea-Cucumber. It has been principally found off the coast of Scotland.

C. peniculus (Holothuria peniculus, 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. commersoni, Common Sea-Cucumber. Great numbers of these animals have been observed off the coast of Wales, and have been dredged in the north and south of Ireland, by Mr. W. Thompson and Dr. Ball.
C. fastuosa, the Long Sea-Cucumber. This is the longest of all the species in proportion to its thickness.

C. hyalina, the Glassy Sea-Cucumber. It is remarkable for its hyaline glossy appearance. It inhabits the Shetland seas.

C. Drummoidii. This species was named after Dr. Drummoid, who discovered it in Belfast Bay.

C. Hydnanae is named after Mr. Hydman, who dredged it in Belfast Bay. It has been since taken in large numbers off the coast of Ireland.

C. Jucica, the Tangle Sea-Cucumber. It has been found in the Shetland seas.

Octus (Forbes and Goodrich) has the body regular, cylindrical, pentagonal, with five rows of distant suckers on the anterior, and a short ventral dental apparatus very short.

Professor E. Forbes describes two species of this genus, which he calls, on account of its size as compared with the Sea-Cucumber, the Sea-Girkin. The two British species are O. brunnea and O. lophura, distinguished by their colour, the latter being milk-white, the former brown.

PEPSIN, a substance found in the gastric acid of man and the lower animals. If the glandular portion of the stomach is treated with extremely dilute acids a substance is thrown down from the fluid by corrosive sublimate, which Schwann first called Pepsin. Wasmann afterwards obtained peptic in a purer form. He proceeded in the following manner:—The glandular layer in the stomach of the pig, which extends chiefly from the greater curvature towards the lesser, is dissected out from the paunch, cut up, then digested with distilled water at a temperature of from 30° to 35°. After some hours the fluid was poured away, the membrane was again washed in cold water, and then heated in the fluid with acid of dilute acetic acid; and repeatedly washed, till a putrid odour began to be developed. The filtered fluid was transparent, viscid, and without any reaction; it was now precipitated with acetate of lead or corrosive sublimate; the precipitate was carefully washed and decomposed with sulphuric acid, the chloroform is then precipitated by alcohol from the watery solution in white flocks.

The peptic thus obtained, forms, when dry, a yellow, gummy, slightly elastic, sublimate moisture; is white and bulky; it dissolves readily in water, and retains a little free acid so as to redissolve it; it is precipitated by alcohol from its watery solution; mineral acids induce a turbidity in a solution of neutralised peptic, which disappears on the addition of a small excess of the acid; but if there be a considerable excess of the acid, there is a flocculent deposit. It is only imperfectly precipitated by metallic salts, and not at all by ferrocyanide of potassium. It has been asserted that peptic is coagulated by boiling, but Forbes and Goodrich have shown that it is not destroyed thereby, if allowed to cool on its admixture with albumen. This substance possesses the converting power so strongly that, according to Wasmann, a solution containing only 1/60,000th part of this substance digests albumen in six or eight hours. Similar experiments have been made by Peppenham, Valentin, and Elsasser.

C. Schmidt has proposed a new view with regard to the nature of the digestive principle. He regards it as a conjugated acid, whose negative constituent is hydrochloric acid, with Wasmann's non-acid or coagulated peptic, as an adjunct; and assumes that it possesses the property of entering into soluble combinations with albumen, gluten, chondrin, &c. Drawing a parallel to this, it more nearly resembles lipo-sulphuric acid than any other coagulated peptic, and as this becomes disintegrated into dextrin and sulphuric acid, so the peptic-hydrochloric acid becomes separated at 100° into Wasmann's coagulated peptic and hydrochloric acid, and in either case it is equally impossible to reproduce the conjugated acid from its proximate elements after their separation. On bringing the complex acid in contact with an alkali, the adjunct—the substance which has been in combination with that acid as a conjugated acid—is precipitated. Schmidt believes that he has ascertained that an artificial digestive mixture, which has expended its solvent and digestive powers, regains them on the addition of free acid; and that when hydrochloric acid is added, the peptic-hydrochloric acid is expelled from its combinations with albumen, and regains its former properties, while the newly added hydrochloric acid enters into its well-known soluble combinations with albumen, &c. By the repeated addition of hydrochloric acid, a digestive fluid or this peptic-hydrochloric acid might preserve 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 Cavenham Press.)

PEPYS, WILLIAM HASSELDINE, 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 cutler and maker of certain classes of surgical instruments. His early histories in some degree resemble that of a remarkable alchemist, who laboured in 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 he delivered a lecture before the Royal Society, on the 'Chemical History of the Ancients,' with a view of showing the importance of physical and chemical education by the discussion of philosophical subjects. Of these Mr. Pepys was one. He became a member of the British Chemical Society 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 Chemical Society, in part also to the establishment of the Geological Society of London, of all which Mr. Pepys was an early member and office-bearer. His skill and ingenuity in the construction of apparatus proved most important to the society, which was founded in 1818, and through the society 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, formed several points in the chemical history, which, which had remained in doubt or been insufficiently examined. In 1865 Mr. Pepys was elected a Fellow of the Royal Society, in the proceedings of which he took an active part on the committee.

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 1865 and 1866, with the intention of supplying for the City of London advantages corresponding to the services rendered in the west 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 continued to hold the office of treasurer and secretary. On his retirement, some years after he was elected a councillor, and afterwards a vice-president, which office he continued to hold during the remainder of his life. Under his direction a voltaic battery of 3000 double plates of zinc and copper was constructed for the laboratory, with which 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, which has undergone electro-magnetic experiments, and constructed for the London Institution, consisting of two plates only, one of copper, the other of zinc, those each fifty feet in length and two in width, coiled around each other. A remarkable experiment repeated by Sir H. Davy with this apparatus is described in a paper by him in the same volume. A similar apparatus was produced, about the same time, but quite independently, by the late Dr. Seebeck, of Berlin.

For about 25 years prior to his decease, the progress of age and infirmity withdrew Mr. Pepys in a great degree from scientific society, but he retained to the last his interest in the progress of science, together with a vivid recollection of the paths which he and his friends and fellow lovers of science took through the chemical arts of Cheshire and the contemporaries of Davy and Wellington. He died at his house in Earl's Terrace, Kensington, London, on the 17th of August 1856, at the age of eighty-one.
PERCH. [Persian; Fish.]

PERCLUSION. [Perkussion.]”

PERRY, John, an eminent physician and pharmacologist, was born in the parish of Shorehit, Lon-
don, on the 22d 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 entered St. John's College, Cambridge, for the study of theology, but afterwards practised as a surgeon and apothecary. His master having died, he commenced attending on the practice of the Aldera-
gate-street Dispensary in 1821. At this time this dispensary was conducted from a house on the Bank, but on the latter institutions, the attendance on the practice of which qualified medical students as candidates for the Apothecaries' licence. The physicians and surgeons of the dispensary gave lectures, which were also recognised by the Society of Apothecaries for the purpose of obtaining a dispensary licence. He practised as a surgeon at St. Thomas's Hospital, and in March 1823 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 his appointment young Pereira at 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. In 1843 he became one of the officers of the society.

He published an English translation of the Latin Pharmacopoeia of the London College of Physicians. He also published a collection of Latin prescriptions entitled ‘Selecta et Prescripta,’ a large number of which have been printed.

He was also appointed to the City-road, who published a ‘General Table of Atomic Numbers.’ In 1835 he became a member of the Royal College of Surgeons. In 1836 he was appointed lecturer in chemistry at the Aldersgate-street School of the College. He delivered the course of lectures on Materia Medica. These 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 discriminative. While lecturing on Chemistry and Materia Medica in Aldersgate-street he undertook the lecture of the class of students at the City-road, who fitted him for working successfully at the Materia Medica, and he produced a work more scientific and practical than any that had before been devoted to the prolific subject of medicines and their actions. Under the circumstances, this was no easy task, but his position as lecturer at the London Hospital School of Medicine, 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. 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.

Of the works brought Dr. Pereira into considerable note as a physician, and increasing practice compelled him to give up his various lecturships. In 1851 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 post of chief physician to 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 making original contributions to the science, his considerable ability in chemical and physiological research. He published a series of ‘Lectures on Polarised 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, and from the not improbable occurrence to this occurrence he had been to consult Professor Quinquet (of the College of Surgeons, London) on a scientific question, and whilst descending a staircase leading to the Hunterian Museum, made a false step, fell, and ruptured the rectus femoris muscle. In all probability, at the same time some internal injury was sustained by the heart or larger vessels; but as only local inconvenience was experi-
enced, no danger was apprehended; but whilst getting up, he fell upon his right side, and fainted. He died in the region of the heart, when he became fully aware 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.

PERCH,

PERICLEAE, a Mineral, occurring crystallised in regular octahedrons. Primary form a cube. Cleavage in three directions parallel to the faces of the cube. Colour obscure green. Hardness equal to felspar. Lustre vitreous. Trans-
lucence. Specific gravity 2.75. It is found in the lava of Vesuvius. Its analysis by Damour gives:

<table>
<thead>
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<th>Component</th>
<th>Formula</th>
<th>Result</th>
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<tr>
<td>Magnesia</td>
<td>Mrs.</td>
<td>28:57</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>1.</td>
<td>6:91</td>
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<tr>
<td>Insoluble Matter</td>
<td>0.</td>
<td>-100:34</td>
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PERISTEDEON, a genus of Fishes belonging to the Acoumopharyngidae with hard cheeks. The body is covered with bony plates, forming a defensive armour. The nasal bone is divided into two parts. The first part is the snout and the second part the nose. The second part is divided into two parts, the first part being the upper nasal and the second part the lower nasal. The second part is divided into two parts, the first part being the upper nasal and the second part the lower nasal.

P. Malabarum, 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 said to be dangerous 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.

PERIWINKLE, A Plant. [Viola.]

PERJURY. A summary power of committing persons guilty of perjury is vested in all the courts of the country 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 from this nature, from the parties being allowed to give evidence in their own causes.

PEROVSKIT, [Munselly, S. 1.]

PERTH. [Canada S.]

PERTHES, CHRISTOPHER FRIEDRICH, one of the most distinguished booksellers of Germany, was born April 21, 1772, at Rudolfstadt, the capital of the petty German principality, which has since been united to the larger state of Thuringia. He was secretary of the exchequer, who, dying in 1777, left his widow and son unprovided for, except by a pension of twenty-one florins to the widow. The widow sought to maintain herself by going to service as a nurse, while young Perthes was confined to the care of his grandfather. On her death in 1779 he was transferred to his maternal uncle, Friedrich Hebel, also a state official of the Prince of Schwarburg, 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 Rudolfstadt, 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 he then made great efforts to repair. While at this seminary however, he was much delighted in reading travels, 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 particular notice of him, 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 apprenticed to a bookseller in Berlin, where it was his fortune to find a master for him. He was rejected by one because he could not construe one, and by another as too delicate; but one, Bihme, agreed to take him as an apprentice at the end of another year. On September 11, 1797, he entered upon his new occupation. His master was not unkind, but strict; he was employed in the lower and more
irksome 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, of 12 years of age, attended him, and read to him a translation of Muratorii'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 could not continue this pursuit by his own exertions. His mother's pension (about 2L. a-year), a few occasional presents from his uncle Hebel, 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 his discharge as an apprentice he was introduced to a young artist named Nessig, 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, hid in his heart the consciousness of his rival. They agreed to each attempt to gain her, and that the unsuccessful suitor was to submit 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 Góthe, Herder, and Schiller. At the Easter of 1796, Hoffmann, a large publisher in Hamburg, having expressed a wish to see some of Perthes's drawings. His master released him from his apprenticeship, which had yet a year to run, and he departed with Hoffmann to Hamburg. While there, he sedulously attended to his business, he had, however, his relations with his master, a real friend, of his rival, Nessig, who undertook to give a faithful account 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 so deficient in the requisites of book selling, 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 booksellers are put to shame for good.' 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 with the most zealous and unswerving energy, and in 1801, he opened an office of his own, and received the name of Alfred Perthes. As soon as this was effected, they both offered their professions to 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-long hope was crushed under her cruel foot.' He failed in his business, in hopes of thus overcoming his apprehended ruin—and succeeded. The partnership with Nessig 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 acquiescence with literary men extended. Fred. H. Jacobi, the Stolbergs, Voss, and Count Reventlow were among them. By Jacobi he was introduced to Claudius, the editor of the "Wandsbecker Botke" (Mes- senger of the German Art). He made an appearance at a short courtship, on August 2nd of that year. She was a delicate 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 a man born to turn my own wheel, and that of others, with energy." In 1799, with an addition of capital, also borrowed, he entered into partnership with a Bernhard von Gersdorff, a merchant, and the business prospered. By 1806, Perthes had an office of the same name in London, Paris, and a branch in Vienna. When his shop was incorporated in 1810 with the French empire. Still the firm went on, though embarrassed by the Milan and Berlin branches, and the censorship to which the press was subjected. Perthes, in compliance with a correspondence, lamented the apathy of Germany under the French yoke, and when the French re- tired before the Russians in 1813, he took an active part in restoring the old constitution, and became a member of the burgher guard. But the French under Davout and Vandamme almost immediately returned, regained possession of Hamburg, levied enormous contributions, and devastated the town. Perthes had sent his wife and family to Wandsbeck, but he was a marked man, and one of those exempted from the general pardon which was proclaimed. He was forced to wear a blue coat, the badge of a Jew, and was declared a spy. It was now that the calm heroism and devoted attachment of his wife displayed itself. She thanked him from her heart "that your name stands among the ten enemies of the tyrant," and subsequently, though suffering extreme depriva- tion, she never failed to do her utmost to assist her husband in persisting in fulfilling his duty. In 1814 they were enabled to return to Hamburg, where, by the exertions of Besser, they met all their trade obligations, and the business again pro- cured prosperity. In 1821 his excellent wife died, after which he resigned the Hamburg business to his partner, and in 1822 removed to Gotha, where he conducted more largely as a publisher, the works chiefly produced being on theology and history. In theology he published for Neander, Ullman, Tholuck, Bunsen, and many others, who were opponents of the rationalistic opinions; and in history he published the 'General History of the State of Europe,' edited by Heeren and Ubert, to which many of the most eminent writers of German literature contributed. It was also published as 'Abkommande von Gotha.' In all these undertakings he was not only publisher, but a most efficient adviser, and his opinions were highly valued, not only by the contributors, but by men like Niebuhr and Eichendorff. His business was almost as fortunate as his first. Charlotte Becker, a widow, was an excellent mother to his children, and an attentive and affectionate wife to himself. Some few years before his death he resigned the business to his son Justus, who is now (1845-5), and of five, published 1844-5, 500 for printing maps on a large scale forms a part. He retired to the village of Friedrichroda, a few miles from Gotha, where, with a cheerful and tolerant piety which had always characterised him, he awaited his dissolution, which took place on May 16, 1843.

Perthes' correspondence was very extensive, and was both instructive and entertaining. Excellent specimens of it are given in 'F. Perthes Leben. Nach dessen schriftlichen und mündlichen aufgezeichneten,' in 5 vol., published 1845-5, by his son, Clemens Theodor, who is professor of law in the University of Bonn. Besides these, some of his correspondence was published in 1819 in 'Etwas über den Deutschen Adel, in Berlin,' a correspondence with Perthes Fouqué, and a correspondence with 'Berichte zur Gesicht der Deut- lands in den Jahren 1800-1809, aus brieflichen Mittheilungen,' letters between Perthes, Johann von Müller, and others, issued in 1803. His son Clemens, besides the Memoirs of his father, has published a volume in honour of the Revolution. Eine Vorarbeit zum deutschen Staatsrecht,' 1845; and 'Einverleibung Krauskas, und die Schlußace des Wiener Congresses,' 1846. The Memoirs have been trans- lated with some condensation, in 2 vols. 8vo, published in 1856.

PESTALOZZI, JOHANN HEINRICH, was born January 13, 1746, at Zürich, in Switzerland. His father, who was a medical practitioner, died when Pestalozzi was about six years old. But his mother, with the assistance of her relatives, procured him a good education. He studied divinity and afterwards law, but instead of adopting either the clerical or legal profession, turned to farming as a means of support. At the age of twenty-three he married the daughter of a merchant of Zürich, purchased a small landed property which he named Neuhof, and went to reside upon it and cultivate it. The reading of Rousseau's 'Emile' had drawn his attention to the subject of education, and he began in 1770 to carry out his views by turning his farm into a school, and conducted the instruction of his pupils by the example of the industrial pursuits as well as in reading and writing. In this, however, he was little more successful than he had been in his agricultural operations: at the end of two years he was obliged to abandon the enterprise and was invol- ved in debt. In order to relieve himself from his incum- brances, and to procure the means of subsistence, he produced his popular novel of 'Leinhard und Gertrud,' 4 vols., Basel, 1751; in which, under the guise of depicting actual peasant life, he sought to show the neglected condition of
then, and till his death the name of Petrovics, equivalent to
'Petersen,' which showed that he was of Slavonic descent;
the son changed the name to Petofi, which has the same
meaning in the Magyar or Hungarian language. The father
was worthy of note, as showing, in conjunction with some similar
instances, that in a country where the rivalry of different
nationalities has been pushed to a disastrous extreme, the
most vehement defenders of one nationality may be recruited
from the other. Petofi, in his youth, was sent abroad, to which
his father, who, having succeeded in trade, was anxious to see his
son in a profession of some kind, and seems to have been indif-
ferent, whether in divinity, law, or medicine. The youth was
wild and unruly, and extravagantly stage-struck, and was
expelled from the University of Salzburg, to which his father
had sent him, for engaging in some theatrical performances.
Not daring or not wishing to return home, he went to Pesth,
where at the age of fourteen he gained a precarious livelihood
by assisting as a scene-shifter at the theatre, but spent most of his time in the streets. His father came to Pesth
in search of him, took him home by force, and kept him as
a sort of prisoner for about two years, after which he again
sent him to school at Oedenburg.

The first thing that Petofi did on arriving there was to go
to the barracks and enlist as a soldier in an Austrian regiment,
which he understood was to be quartered in the Tyrol, when
he intended to desert, and enjoy a free life among the
mountains. The regiment was sent instead to Croatia, and
in the discharge in that country he fell ill, and was con-
tinued seriously affected so long that the regimental doctor
in 1841 recommended his discharge. Being now of the age
of eighteen he resumed his studies at the college of Paps,
where he was a member of the University of Vienna, and
have since attained to some eminence—Orlay as a painter,
and Jokai as a novelist. At that time Orlay was ambitious of
becoming a poet, Jokai a painter, and Petofi an actor, and
all three failed in their respective ambitions. Petofi, who
left college to continue his studies of law in Pesth, seems
ever to have met with even the most moderate
degree of success, and was soon plunged in the most abject
poverty. He had long been in the habit of composing songs
and poems for his own amusement, and on this occasion
called on one of his old associates, a publisher called
Bajza, the editor of the 'Atheneum,' a popular periodical, mentioning to him that they were the composition of one Petofi, but not mentioning
that Petofi was himself. The poems awakened the attention of
Virovatsky, at that time the managing editor of the 'Debrecin,
who predicted that the author would soon stand high,
and began to exert himself to bring him into notice. Some other
friends procured him literary employment to translate into
Hungarian a novel of G. F. K. James, entitled 'Forest
Sorrows,' and he also translated a number of the works
of pupils and of visitors. Unfortunately dissensions arose
among the teachers, in which Petofi himself became
implicated, and which embittered the latter years of his life.
The number of the pupils actually present at the Institute
came to be a losing concern, and Petofi was again involved
in debt, which the proceeds of the complete edition of his
works ('Petofi's Sämmtliche Werke,' 15 vols., Stuttgart
and Tübingen, 1819-30) hardly sufficed to liquidate. This
event was the result of a subscription got up in 1816 for
the publication of his works, the names of the Emperor of
Russia, the King of Prussia, and the King of Bavaria standing at
the head of the list.

In 1837 Petofi retired from his laborious duties to
Nagymaros, where his grandson resided. Here he wrote his
'Schwanengesang' ('Song of the [Dying] Swan,' 1826;
and 'Meine Lebensschicksale als Vorsteher meiner Erzie-
hungsanstalten in Burgdorf und Ittern.' ('My Life's Fort-
resses as Superintendent of Educational Establishments
at Burgdorf and Yverdon,' 1826). He died February 17,
1837, at Brugg, in the canton of Aargau.
for hostility to the aristocracy, as well as by a warm feeling
of personal independence.

On the 16th of March, it was Petőfi who incited the
students of the university to action by reading aloud
in the yard of the university his poem of 'Tarlapa Magyar' ('Hunga-
rarian, up!') which was received with shouts of applause;
the poem is in manuscript and several copies, being the
first 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
assembly 'sing and shout'. The im-
vasion sobh.' ('Now or Never'), and 'Csataidal' ('Battle-
Song'), 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 denouncing the government and his
low estate. When on the 21st of August 1846, 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 in the side of the
Moderates, who, on that occasion, were first brought into
a majority by the party of Kossuth. Petőfi, who, only a few years
ago had denounced the influence of:
the poems to Vörösmarty, "as a sign of love and esteem," on
this occasion wrote a poetical address to him renouncing his
friendship, each stanza concluding with the lines,

'If I do not tear the laurel from thy brow,
Fix thy own hand on it now;'

and in spite of the remonstrances of mutual friends, gave it
to the public in the 'Eletkepek' ('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 division of the army under the command of General
Bem, who appointed him his 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
Mátyásmező, and his publishing the mark- ing
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 Bem, and he shared the last terrible
campaign of that general 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 1855 a report was in
appearance of a Hungarian regiment,
in London, and elsewhere, that Petőfi 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 to be no possibility that he is still among the
living. In the last poem of the first edition of his works
beginning 'Egy gondolat bán engemét,' he expresses a horror
of dying in bed, and puts up an ardent prayer for death
on the battle-field.

There is a collected edition of the poems of Petőfi 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 to
be found in a volume entitled 'Hungok & multobul' ('Sounds
from the Past'), published at Leipzig in 1851, of which a
German translation by Vási and Benkő, with interesting
notes, appeared at the same time. The title of
'Nationaleider der Magyaren.' As the wonderfully idiom-
alistic elegance of the language is always spoken of as one
of the principal charms of the poems of Petőfi, the foreign
reader can hardly expect to appreciate them with any
approach to the results of a native; but there is a lore as to
information chiefly taken, informs us that in English his
favourite authors were Shakespear, Byron, Moore, and
Dickens; and that he was accustomed to call Dickens, from
the kindliness which his writings tend to inculcate, a "ben-
efactor of mankind." Characteristically enough in a
songwriter, he regarded Béanger 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
some measure in a translation of the 'Eletkepek.'

PEVENSEY. [S.]

PHARMACOSIDERITE. [MINERALOGY, S. 1.]

PHASMID. A tribe of Orthopterous Insects, embracing
embracing the Grasshoppers, the Crickets, and the
locusts, from which they are distinguished by the fore-
legs being of the ordinary size, and fitted like the rest for
walking rather than running. From the other Orthoptera
they are distinguished by the hind legs not being saltatorial.
The point of the hind legs is usually concealed in the
Mandibles, from which they are not separated by the
outer edges; the former are of moderate size, an oval subangular in form, with
large globular eyes, in front of which the antennae are placed, which
are variable in form, but ordinarily long, slender, and
composed of a great number of articulations. The occelli are
rudimentary or obsolete. The labrum is deeply notched in
front; the jaws are strong and horny. The dorsal surface in
both sexes consists of nine segments, but only seven are
distinct in the females. All the legs are alike, being long and
slender. The fore wings are of small size, and attached at the posterior
part of the mesothorax. The true wings are very large and
attached to the anterior part of the metathorax. 'As they
far exceed the wing-covers in size, it is essential that provi-
sion should be made for their defence, and that they may be
passed as in the earwig, by the transverse folding of the wing so as
to enable it to be folded beneath the small wing-cover, but
by the front margin of the hind wing being greatly thickened,
serving as a flat plate, beneath which the other part of the
wing is folded against the latter part being often dif-
ferently coloured. Thus in some species the short wing-
covers and the front margin of the wing are pale-green,
whilst the other part of the wing is pink. Many species
possess wing-covers throughout the year, others after
acquiring wings or wing-covers.' (Westwood, 'History of
Insects.')

The odd appearance of these insects have got them for the
name of Walking-Sticks, Staffs, Leaves, Spectres, &c.,
certainly nothing can be imagined more curious than the
forms they assume. In many instances they might be
misled for a portion of the branch of the trees on which they
rest.

RENKITE. [MINERALOGY, S. 1.]

PHENYLE. [CHEMISTRY, S. 1.]

PHILLIPS, RICHARD, F.R.S., some time President of
the Chemical Society of London, first Curator and Chemist of
the Museum of Practical Geology, an eminent mineral-
ologist, and another member of the "Ultimate Chemical Club.
James Phillips, a member of the Society of Friends, who
headed the business of a printer and bookseller in George
Yard, Lombard Street, London. Richard was born in the
year 1786. He was educated as a chemist and druggist, under
William Allen, at the well-known pharmaceutical establish-
ment, Plough-court, Lombard-street, London; but he received
his first instructions in chemistry from Dr. George Fordyce.
Richard Phillips and his older brother William, the
mineralogist, William Allen, Luke Howard, and several
other members of the Society of Friends, and three young
men who were not Quakers, were among the founders, eight
in number, of the Askean Society, already noticed in a pre-
ceding article on Mr. Pepys, who was one of those three.
Richard Phillips was elected a member of the Askean Society
as address president of the Chemical Society in 1866., "we
are indebted for the first correct analyses of the Bath waters,
in the course of which investigation he discovered the cause
of the apparent uncertainty in the indications afforded by the
steam tests for iron, caused by the variations that occur in
their effects, according as carbonate of lime is present or
not." The elaborate paper stating the process and results of
these analyses, was first communicated to the Askean Society.
His labours in mineralogical chemistry were characterised
by great neatness and precision, so that they may indeed be
appealed to at the present time as models of skilful and
exact research. The analyses of the Bath waters were suc-
ceded by the completion of one of the rarest of rare minerals.
In 1832 he discovered that the mineral called uranite was not the hydrated oxide of uranum,
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as it had been previously supposed to be, but by a hydrated double phosphate of that metal and copper. The presence of phosphoric acid in uric acid had escaped the scrutiny of Berzelius, who was thus as much outdone in this particular matter, owing to the subject of this paper, as Berzelius was when he detected the presence of the same acid in wattlewood, which the great English chemist had overlooked.

The late Dr. Thomas Thomson, Regius Professor of Chemistry in the University of Glasgow, the author of the course of lectures on the 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 Mr. R. Phillips—a testimony involving also commendation of the work of Paul Hulth, the first chemist of science in this country, which thinking men of all ranks perceive to be of daily augmenting importance to the community:—"Of modern British analytical chemists, says he, in his 'History of Chemistry,' 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 a livelihood in this country except by turning one's attention to trade or manufactures."

It was however in the pharmaceutical branch of practical chemistry that Mr. R. Phillips's services were most conspicuous, as may be seen by the several publications of which he was the author. One of them is 'The first edition of the famous "Handbook of the Pharamaceutical Society," which originally appeared in "Blackwood's Magazine," but which has been reprinted two or three times reprinted in a separate form. He afterwards wrote other tales in the pages of that and other periodicals, but none of them we believe were published with his name. In 1850 he published a brief space of time. Phillips died in 1854, and his brother-in-law, Mr. R. Phillips, was the last private of the profession to carry on the business of the late Mr. Phillips. In 1855 he was admitted to the bar at the seat of the Marquis of Ailsbury in Wiltshire, in order to read with Lord F. Bruce, and whilst he was there he was thrown from a horse and seriously hurt. He had perhaps always had a tendency to consumption; it was developed by the hurt, and during his remaining days he worked with the weight of that terrible malady pressing upon him. But he worked steadily on, and was able to secure himself a handsome income, and an honourable position among his literary contemporaries. Writing exclusively in newspapers and periodicals, it was only in the last year or two of his life that Mr. Phillips was at all known by the name of the general public, yet he probably exercised a much more considerable influence on public opinion and public taste than many much better known, as a writer in such papers as the "Times," the "Morning Herald," but he afterwards became one of the chief editors of the literary staff of the 'Times,' and during some years his brilliant criticisms on current literature awarded an agreeable relief among the news and politics of that powerful journal. In the 'Times' his pen was exclusively confined to literary criticism,—at any rate he never wrote "leaders"—and he continued to write its more important reviews down to his death. Two volumes of 'Essays from the 'Times,' by him, were published, though still without his name, in 1858 and 1864. "Locid, picturesque, often eloquent, and sometimes bitterly keen, yet discriminating, and with all the appearance of being scrupulously fair, they will no doubt keep their place as a permanent addition to our store of that class of writing which, in the opinion of many, is the most useful which appeared after the publication of these volumes, are of at least equal merit. Besides his papers in the 'Times,' Mr. Phillips wrote reviews in the 'Literary Gazette,' &c. He also purchased, and for a time edited, the "John Bull" newspaper, but without much pecuniary success. In the formation of the Crystal Palace Company he took an active part; and for a time acted as secretary, and subsequently as "literary director" to the company, and many of the arrangements for the exhibition, he the model of his own, were contributed by Mr. Phillips. The Crystal Palace was likewise the general 1. Guide to the Crystal Palace, and Park; and the 1. Portrait Galleria of the Crystal Palace. He died at Brighton, where he had gone on account of his health, on the 14th of October, 1864, from the rupture of a large vein in the innominate artery, which had been caused by the removal of the artery for which he had been enabled to make a comfortable provision. In 1852 the University of Göttingen conferred on him the honorary degree of LLD.
PHI

PHILLYRINE. [CHEMISTRY, S. 2.]

PHLEGM, a common name for Mucus. [Mucos.]

PHOEBUS. [IDIOLOGY, S. 1.]

PHOLARITE. [MINERALOGY, S. 1.]

PHOSPHATITE, a name proposed for the native Phosphate of Lime derived from organic sources, and usually called Coprolite. The latter term conveys an impression which is not altogether false, for the phosphates of bones of large size are constantly present, and it is questionable if any portion of this phosphate has ever been excremental. Some of these coprolites are of very recent date, but 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 the late Mr. T. M. S. Seebeck, Berthollet, and Becquerel on the Continent—testify 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 pursue a complete activity of mind and body; its practical aims are carried on in the 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.

Photography has been so fully treated of by Mr. Robert Hunt, in his "Researches on Light," and in his "Treatise on Photography," and also by the Abbe Moigno, in his "Reperoire d'Ooptique Moderne," that we need not do here more than recapitulate in a brief manner the points of chief importance previously given by those authors.

It may be well to say at the outset, that it was not till the year 1839 that Photography acquired for itself "a local habitation and a name," through the investigations of Fox Talbot and Daguerre, which resulted in the introduction of the two processes known as the Calotype or Talbotype, and Daguerreotype. As usual in the history of art and science, approximations had been attained to by earlier experimenters. It is interesting to inquire into the labours of some of these. Proceeding historically, we shall find that observations relating to the science of photography precede the first attempts at establishing the principles of the art.

In 1729 Petit noticed that solutions of nitrate of potash and muriate of ammonia crystallised more readily in the light than they did in darkness. In 1777 the ill-fated Scheele writes, "It is well known that the solution 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 much more evidently, with regard to liquid without solution. Again, "Fix a glass prism at the window, and let the refracted sunbeams fall on the floor. In this coloured light put a paper screwed with luna cornua (chloride of silver), and then let the paper be removed from the light, it will become sooner black in the violet ray than in any of the other rays."

Senebier repeated these experiments, and also experimented on the influence of light in the bleaching of wax.

In 1796 Count Bumford sent to the "Philosophical Transactions" a memoir entitled "An Inquiry concerning the Chemical Properties that have been attributed to Light."
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 all objects produced by means of the solar microscope may be copied with difficulty on prepared 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 a small distance from the camera."

The muriate (chloride) of silver was found to be more sensitive to light than the nitrate. "Even in the twilight, the colour of the moist muriate of silver spread upon paper slowly changed from white to faint violet; though under similar circumstances, the nitrate of silver was insensible upon the nitrate." Davy concludes with these remarkable words: "Nothing but a method of preventing the unshaded parts of the delineations from being coloured by exposure to the day, is wanting to render this process as useful as it is (now) seen.

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 neighbouring country, France. In 1813 M. Niépce, of Chalons on the Soane, was engaged in a task identical in conception with that of Wedgewood. He was endeavouring by means of bituminous varnishes and metal plates to fix permanently the images of the camera, and in order to accomplish the object he was engaged on, he carried on 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. He died in 1833, and the art was lost for some years. He there however continued his experiments, making pictures in pictures of the surface of bitumen laid upon a metal plate, which he 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 solvents of bitumen no longer act 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 naphthas, for example, furnish. But when a metal plate had been thus treated, and the image was examined in the camera, the shadows nothing was easier than to etch such a plate by means of aqua fortis, and this was what Niépce did. A plate thus made and prints from it are now in the possession of Mr. Robert Brown, of the British Museum. It is to be hoped that they will be placed in the Museum itself. M. Niépce named his art Heliography.

In 1839 M. Niépce became acquainted with a M. Daguerre, who was noted for his dioramic paintings, and who was, it is alleged, as the first to apply the camera to the reproduction of the camera. A deed of partnership was executed between the two experimentalists, and they jointly pursued their labours until the death of Niépce, in July 1833. A new arrangement of the process was made between his son M. Isidore Niépce and Daguerre.

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. On the 19th of January communicated to the Royal 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 Brush." In the same year, the 21st 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 their processes; the 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, which gave images under the influence of the camera, and 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 Daguerreotype. 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 black dots in proportion to the quantity of iodine absorbed. The exposure to the vapour was continued until the plate assumed a rosy tint, or simply a deep orange-yellow, bordering on red. The plate was now sensitive, and had only to be exposed at the focus of the camera obscura in order to obtain a picture of the objects in front of it, as perfectly as if they had actually 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 hypsophlite of soda was used to fix the image by removing the compound of iodine and silver which still adhered in some degree the shadows on the plate. Subsequently M. Fizeau improved the appearance of daguerreotypes by imparting to them a warm tinge by a thin film of gold which was thrown down upon the image by a spontaneous electro-chemical action.

The original daguerreotype process was not sufficiently sensitive to be used in portraiture. To Mr. Goddard we owe 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 the process known as Goddard's process. In the dull weather of November of that year, he obtained a half-length portrait in 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 anodize it by means of tripoli powder and oil of lavender or rosemary, applied by cotton velvet; finishing the polish by clean cotton velvet alone. Then expose the silver to a mixture of iodine and bromine in such a manner that the vapour of the iodine shall act equally upon the surface of the silver plate, to which it imparts a coating which is seen to be coloured when examined by light reflected from any white screen, a piece of paper for example. As soon as the plate has assumed an orange-yellow colour it is developed in water 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 soon as the plate has been obtained, the plate must be removed and again exposed to iodine and bromine for a few seconds, the rose colour has deepened into a plum tint. The plate is then ready for exposure in the camera obscura. No time can be wasted for these various exposures as temperature influences the results. After such preparation a few seconds are sufficient. The plate must be prepared in a room which can be darkened, the light of a candle, or that obtained through yellow glass being alone used at the last iodizing, and in some of the subsequent operations. After exposure in the camera the plate is exposed to the vapour of mercury for a few minutes, the mercury being at a temperature of about 180° Fahr. Here the picture is developed by the action of the mercury upon the bromo-iodised surface, the mercury being, it is believed by some, deposited in the plate in proportion to the amount of light which fell upon its surface during its exposure in the camera. On its removal from the mercury box the plate is partially fixed by washing its surface with a strong solution of hypsophlite of soda. The final fixation is effected by boiling upon the plate a solution of a double salt, called hypsophlite of soda and gold. The image is now fixed upon the plate, and may be coloured by brushing over it colours in very fine powder. The image should be kept as to exclude the vapour of lime from the atmosphere under which it is usually found in large towns. Sulphuric and hydrochloric acid will affect the surface.

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 consists in fixing the image on a film, on glass, on 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 result.

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 referred to the researches of T. and J. R. Adams.

Take of pure nitrate of potassium 150 grains; 250 grains, of nitric acid (specific gravity 1.833 about 1834) draehms, of water 12 draehms; stir together, and when at a temperature of from 150 to 160° Fahr., add, bit by bit, 15 grains of cotton-wool to each ounce of the acid mixture. Allow the cotton-wool to soak 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 6draehms of pure ether (ep. gr. 7.85 to 7.88), and 3draehms of nitric acid (specific gravity 1.833 about 1834) to the above solution, and the solution once dissolved. In another bottle prepare what is called the 'iodising solution' by taking alcohol (ep. gr. 818 to 830) one ounce, iodide of potassium 12 grains, iodide of cadmium 4 grains, and benzine 3 draehms, and mix all in the above solution for use. To make 'iodised collodion,' mix six draehms of collodion with two draehms of the iodising solution; this mixture changes by keeping, and should therefore be made only in moderate quantities. Having prepared the iodised 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 then run off at one corner and the bottle set aside for the purpose. After a few seconds the surface of the plate forms a firm tough skin tight fit for immersion—in the dark—in what is called the 'nitrate bath.' This bath is made by dissolving 30 grains of nitrate of silver in one ounce of distilled water. The nitrate of silver should be pure, and free from excess of nitric acid, and it should be saturated, when in solution, with iodide of silver; a little acetic acid, too, may be added. The plate is immersed in this bath for a few minutes, drained, and then exposed in the camera obscura. To develop the image, a solution of hypo-sulphite of soda, 1 ounce, nitric acid, 1 ounce, water 100 grains, is fixed on a strong solution of hypo-sulphite of soda, in which it is eventually mered, 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 Taltotype 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 done, but we shall only detail one which answers perfectly. Take the white of an egg and beat up, with every fluid ounce of it 12 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 water will separate and be again precipitated. 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, and then only take it up, as in the calotype albumen.' As the white of egg mixture is now 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 floated upon a solution of nitrate of silver: the white of egg paper floats on, and remains white. Here it is left for two or three minutes, and then removed and suspended to dry. This last operation must be per-
of the Paris Academy of Sciences, in our own Royal Society's 'Transactions,' and above all in the journals of the various Foreign Academies.

PHY, CIS, 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 barbel. It is named after the Common Fork Beard, a rare fish on the British coasts. It has been taken most frequently in Cornwall. It is about two feet in length, but not very good eating.

PHYSIC, PRACTICE OF. The more common 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 Necessity, 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 an alphabetical form.

ACCLIMATIZATION 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 he has been accustomed, and which enables it to resist those causes of disease which render it injurious under the first treatment. 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 which it deserves. It appears that the white races attain their highest 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 they begin to deteriorate and exhibit unmistakable symptoms of decadence in both health and strength. The same law holds good with the dark races of the tropical parts of the earth. The negro who lives in the interior of Africa, is killed by cold. The limits of his health and strength are at 40° or 45° north or south. If he proceeds to higher latitudes, he deteriorates and becomes exterminated. 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 prescribed salubrious limits. All of them seem to possess a certain degree of constitutional liability by which they are able to bear, to a certain extent, great changes of temperature and latitude; and those races that are indigenous to the equatorial or tropical regions, are the most insensible to the extremes of other 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 endure 30° south or 30° north with comparative impunity, the Eskimians in the Arctic North, and the Negroes in the equatorial regions, on the other hand, have no power 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 tanned to a rich plum plethoric frame becomes attenuated; his blood loses fibrine 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 look forty, and sooner or later the superfluous duration of life is shortened (as shown in life 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 become homesick in the tropics; but in the habitations on the distant land affords no immunity from the diseases of its climate, which act with redoubled 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, Tulliboch, 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 they enjoy of obtaining changes of situation, or cool climes 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 condition of the man; and when his descendants are taken 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; a prolonged residence 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 regiment long men 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 M. de Fuzelier European regiment, for instance, Dr. Arnott 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 is reduced by a loss of 1000 men in nine years, and seven months in favourable times, and with all the improved conditions of the service. Dr. Arnott's statistics show that the Bengal army loses annually 9 per cent. of its numbers, giving a total loss of eight years of upwards of 14,000 men out of an army of 150,000 men."

(Atten's 'Handbook of Medicine.')

"In the island of Ceylon the rate of mortality has been recorded among five different races of which the British troops are composed. The following table gives the result:

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<thead>
<tr>
<th>Race</th>
<th>Annual death in 1000 men</th>
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<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>
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<tr>
<td>English troops</td>
<td>69</td>
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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 in habitually cold climates; 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 that not amongst the natives of these countries, but made their way from warmer countries, and that changes 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 removal 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 accultilation.

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 called 'Bronzed 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 actual discompositions of the supra-renal capsules. These bodies belong to the class of ductless glands, and till the time of Dr. Addison's researches upon bronzed skin appeared, little was known of their use and functions in the human body. The following conclusions with regard to these bodies arrived at by Dr. Martby as the result of his experiments —

1. The supra-renal capsules are not solely fastid 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. That the absence of their function is attended neither by amnesia nor debility.
6. That death follows an experiment, it occurs as the result of injuring neighboring parts.
7. That absence of the supra-renal bodies is not proved to be a cause of death, but a consequence of the transformation of hematin or in increasing the formation of blood-crystals.
8. That the suppression of the supra-renal capsular function is not attended by an increased deposit of pigment in the skin or its appendages.
9. That the presence of the connection of the bronzed skin and supra-renal capsular 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 betwixt a bronzed skin and supra-renal capsules is not clearly made out.

The distinguishing features of the disease to which the name 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 capsules. The general symptoms are in fact those of anemia, or cases in which the blood is not of the proper character. The patient is said to have this discoloration of the skin, that it usually increases with the advance of the disease. "The anemia, languor, failure of appetite, and feebleness of the heart become aggravated; a darkish streak usually appears upon the commissure of the lips. The patient is emaciated and dry, and the 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 capsules were found universally diseased after death, the mottled or checked discoloration was very manifest, the patient was emaciated, the heart of the patient was so emaciated and vomiting urgent; but the pulse, instead of being small and feeble as usual, was large, soft, extremely compressible, and jarring on the slightest exertion or emotion, and the patient speedily died." (Addison.)

Although the connection between the state of the skin and the disease of the capsules was exhibited in all Dr. Addison's original cases, many exceptions have been recorded. Cases have occurred in which extensive disease of the suprarenal capsules has been observed without the bronzed skin, and cases of bronzed skin have been seen where no disease of the supra-renal capsules could be detected after death.

Dr. Harley, in the paper referred to, concludes—
1. That bronzed skin may exist without the supra-renal capsules being diseased.
2. That complete degeneration or total absence of the supra-renal capsules 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 suprarenal capsules.

4. That bronzed skin may be present without any derangement of the other functions of the body being observed. ('British and Foreign Medico-Chirurgical Review,' No. 42, 1848.) Dr. Harley is of opinion that the general symptoms in this disease are produced by a "diseased state of the solar plexus per se, on by irritation of the ganglionic system of nerves, caused by the close proximity and intimate connection of diseased supra-renal capsules." The blood has been examined by the microscope in some of these cases, and found to present an increased quantity of the white cells, as the transformation of the disease known as Leucocytoma. [Blood, Diseases or.]

The microscopic character of the skin has been carefully examined in this disease, and it has been found to present the same pathological changes observed in the skin of the black man. The pigmentary matter of the skin is 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 cause. The remedies which would be applicable to bloodless and depressed conditions of the system should be used here. Tonics, nutritious diet, fresh air, and the means resorted to for restoring health in anemia and iron in their various forms, are recommended.

The prognosis in this disease is unfavourable, although cases are reported in which recovery has taken place.

Anemia, a diseased condition of the human body, in which is implied either a morbid condition of the blood, or a relative insufficiency of the active constituents. This disease is also called oliganemia and spasmnemis, terms which, like anemia, 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 skin, and the sense of the heart being in the center of its movements. It is generally a nervous disease, the conjunctiva is of an unnatural white, having a pearly lustre. The veins on the surface are small, blue, and collapsed. General symptoms are frequently attended with derangements of the nervous system. There is frequently violent pain in the head, and not infrequently, excited and ordered sensations, as singing in the ears and flashings before the eyes. The whole surface of the body is frequently prematurely tender, the slightest touch causing the patient to start. The course of the spleen is frequently excessively tender, leading to the supposition that there is spinal irritation. The circulating system is deranged; palpitations of the heart come on after slight exertion. The pulse is mostly small, feeble, and quick, excited to rapid action on slight motion, at rest diminutive and slow. The patient is generally lassitude 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. There are heard in the heart are a 'bell-like' sound, and heard in the heart is a 'belting' murmur of varying intensity, and is heard most distinctly at the apex. This sound is not present in all cases of anemia, nor is its occurrence diagnostic of anemia; but it is very important to know that it may be entirely dependent on the anemic condition, and removed with it. The arterial murmurs are not frequently heard; they are synchronous with the beat of the pulse, and when present may even be recognized by the character of the pulse. The venous murmurs are generally present, and may be heard in the neck, ears, and 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 jugular vein." (Aitken.)

The venous murmurs are seldom absent to a greater or less extent in anemia.

When the blood of anemic persons is examined under the microscope a deficiency of blood globules is observed. The number of blood corpuscles may be from 20 to 30 millions in 1 cubic inch of blood globules in 1000 of blood. The other constituents of the blood, as far as observations at present go, seem to suffer little alteration.

The cause of anemia are anything acting on the system by which the production of blood is diminished or the healthy 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, as from haemorrhoids, the stomach, lungs, wounds, &c. 6. All extensive discharges from wounds, ulcers, or mucous surfaces.

A knowledge of the cause of anemia at once suggests its treatment. Where it depends on a want of food altogether, or of proper food, then food of a proper kind must be supplied. Where improper food, as alcohol, produces imperfect assimilation, it must be withdrawn. Deficient nutritive changes often come on as the result of impure 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 corpuscle-count increased from 38 to 72 millions. Other tonics may also be administered with advantage. In cases of anemia in marshy districts quinine is of great service.

Baum's Disease. An affection of the kidneys, having very definite symptoms, and exhibiting uniformity of struc-
several stages or varieties, and some discussion has taken place as to whether the symptom of albumen in the urine may occur in several distinct classes of conditions of the kidney. There is no doubt that albumen may be found in the urine in even functional derangements of the kidney; but the term Bright's Disease is very conveniently applied to all those forms of structural change in the kidney which are accompanied with albuminous urine.

The general symptoms accompanying this disease vary according to the intensity of the disease and the condition of the patient. One of the first symptoms to which the physician is made aware, is the presence of dyspepsia. This may occur in the skin or in any of the cavities of the body. It is frequently noticed in the face; and in all varieties of this disease an effusion of fluid is observed underneath the conjunctiva, producing the appearance of a watery eye. A discolored discoloration of the mucous and serous membranes are very common accompaniments of Bright's disease. The heart also is frequently affected, and pericarditis and endocarditis are observed. Affections of the brain are also not infrequently present, especially in the more severe cases arising from the poisoned condition of the blood.

In all cases of this disease, the urine contains albumen. This is easily detected either by coagulating the albumen by heat, blood, or urine, whilst healthy urine has a specific gravity of 1.020. It contains less urea than healthy urine. Under the microscope it also presents appearances indicative of the nature of the disease. These appearances are very characteristic of the minute tubes of the kidneys, formed by substances produced in various stages of the disease. They are thus classified by Dr. Bennett:

1. Excretive casts, consisting of the coagulated exudation only which is poured into the tube during the inflammatory stage.
2. Desquamative casts, consisting of masses of the epithelium lining the tubes, and occurring in all stages of the disease.
3. 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.
4. Waxy casts, presenting an exceedingly diaphanous and structureless substance. They are frequently associated with the last two.

Dr. Bright originally described three stages of this disease, but later observers have recognized six.

1. The natural form, in which the kidneys are enlarged, and contain an increased quantity of blood. In this stage only a small quantity of urine is passed containing the excretive and desquamative casts.
2. In this stage the kidneys are enlarged to nearly double its usual size, and the surface is highly granular in its appearance. The tubes of the kidney are obliterated by the inflammatory deposit. The urine is very albuminous, and of light specific gravity.
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 charged. 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 pocked, the tunic adherent. There is no deposit in the tubes, but fibrous matter has been deposited in the walls of the kidneys, and the tubes are stringed. The urine may not contain albumen. Its specific gravity is sometimes as low as 1.006.
6. This stage has been called the 'cousine kidney.' The organ is large and dark. The specific gravity of the urine is high.

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.

This discussion which will unduly excite the action of the kidney. 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 scotomata, when the skin is highly susceptible of any diminution of temperature.

The treatment must be active in the early stages. Purifications may be given and blood abraded locally, and the patient kept in bed and placed in a suitable situation. Operation is beneficial. When chronic, diaphoretics 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 serviceable; and a nutritious but non-stimulating diet, with 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 sickness—consumption. Continued Fevers, Eruptive Fevers, Syphilis, Mercurial Poisoning, Rheumatism, Gout, Scrobutics, Obesity, Leucocytosis, and Pyemia. With the exception of the two last, these diseases have been treated of in the 'Fenny Cyclopaedia.'

Leucocytosis is a term applied 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 of things is brought about by loss of blood, chronic diseases, more especially affections 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, which are called leucocytes, is due to two causes: first, to the destruction of the red corpuscles, and secondly to the liberation of the corpuscles from the lymphatic glands and spleen. The leucocytes 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 known as leucocytes. Dr. Virchow in his work on the 'Principles and Practice of Medicine,' (1858), 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 from the lymphocytes of the lymphatic glands, and that the great majority of them, on joining the circulation, become coloured in a manner as yet unexplained. Hence the blood may be considered as a secretion from the lymphatic glands, although in the higher animals that secretion only becomes fully formed after it has received colour by exposure to oxygen in the lungs.

2. That in mammals, the lymphatic glandular system is composed of the spleen, thymus, thyroid, supra-renal, pituitary, pelvic, and several accessory glands.

3. That in fishes, reptiles, and birds, the coloured blood-corpuses are nucleated cells, originating in those glands; but that in mammals they are free nuclei, sometimes derived as from such glands, at others developed within colourless cells.

4. That in certain hypертrophies of the lymphatic glands in man, their cell-elements are multiplied to an unusual extent, and under such circumstances find their way into the blood, and constitute an increase in the number of its colourless cells. A corresponding diminution in the formation of free nuclei, and consequently of coloured corpuscles, must also occur. This is leucocytosis."

The treatment of this disease must be directed to the removal of those affections by which it is preceded and accompanied. Unfortunately, these are mostly of such a nature as to resist all treatment after the white cells have been discovered in the blood.

Pyemia. Put in the blood. By this term is understood a peculiar and dangerous disturbance of the system, supposed to be produced by the admixture of pus with the blood. In the cases in which this disease occurs, the pus is supposed to gain access to the blood from a suppurating surface in which the veins are opened, or by the production of pus on the surface of the vegetable matter, or of an erupting phlebitis. Many cases, however, of this disease have been recorded in which no open suppurating wound of the body could be discovered.

The removal of pus in more or less violent shivering fits. When suppurating surfaces exist they dry up, or the discharge becomes greyish and fetid, the surfaces of the wound assume a withered, flabby aspect. The patient becomes exceedingly languid and exhausted, and is sometimes plunged into a deep stupor, or has occasional delirium. On the inspirations increase, the breath exhales a purulent
colour, the lungs are congested, the skin becomes daily more yellowish, articular pains with swelling, and intra-synovial effusion 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 thready, the head is hot and dull, and if the patient examine himself, 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, pleurs, joints, muscles, and the subcutaneous regions. 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 the white corpuscles have not been noted and distinguished in the blood from the pus-cells, and have been supposed to be identical (have been observed.

The pathology of this disease has excited much discussion. Whilst some have regarded it as entirely dependent on the introduction of pus 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 animal without producing ill effects, and the above symptoms came on in the animal, and the symptoms of scarlatina, were more probable therefore that the disease arises from a peculiar state of the blood, either arising from vital changes in itself, or produced by the introduction of an external poison.

This disease is most frequently fatal, and no one plan of treatment can be laid down. Where suppuring 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 when only a few distinct symptoms resembling each other have been included.

Dr. Jenner has given the following summary of the various forms of fever now recognised as follows:—

**Fibrículos.**—A disease attended by chilliness, alternating with a sense of heat, headache, white tongue, confined bowels, high-coloured scanty urine, hot and dry skin, and frequent pulse, terminating in from two to seven days, and having for its cause exposure, over-fatigue, &c. (t. e.) the cause of fibrícula is not specific.

**Recurrentes:**—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, frequent pulse, hot skin, and occurring at definite intervals. It resembles a tertian fever, but with less esence in from five to eight days; in a week a relapse (i.e.) a repetition of the symptoms present during the primary attack. After death, spleen and liver are found considerably enlarged; absence of marked congestion of internal organs.

**TYPHOID FEVER.**—A disease arising from a specific cause, attended by rigors, chilliness, headache, successive crops of rose spots, frequent pulse, sonorous rale, diarrhoea, fulness, resuscitation, and tenuity of the abdomen, gurgling in the right side of the abdomen, increased spleenic dulness, delirium, dry brown tongue, and prostration, and terminating by the 30th day.

After death enlargement of the mesenteric glands, disease of Feyer's patches, enlargement of the spleen, disseminated haemorrhage, and inflammation of the heart, and blood vessels in this country as a variety of croup, and by others as a form of scarlet fever. Now that it has appeared, few observers could be found who would not agree that it is a disease with specific symptoms. The invasion of this disease has been looked on with peculiar alarm, as there is something very sinister belonging to the contagious or communicable class. It is also very fatal, and already a large amount of mortality has been caused by it in this country.

The symptoms of this disease are the formation of a false membrane upon the surface of the mucous membrane of the larynx, and the fauces. This membrane is of a whitish or ash-grey colour, and frequently extends forwards from the pharynx and tonsils to the soft palate and into the nostrils, and sometimes covers all the mucous membrane of the larynx and the trachea, and in this respect it differs from croup, and may be easily distinguished from it. When the
membrane is found in the larynx or trachea, it is always sub-
sequent to its appearance in the fauces. At the commence-
ment 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, and the disease becomes more 
severed, the membrane is found to have spread to the base of the tongue, and when the tongue is loaded, the pulse is frequent and feeble. In the early stages it may be taken for scarlet fever. But there is no active 
fever, nor eruption of the skin, no redness of the papillae of 
the tongue, and when the patient recovers, no disappearance of the 
membrane as is constantly the case in that disease.

The general symptoms are those of low fever. The dis-
case sets in with shivering and intense depression, there is 
dryness and tingling of the throat and ears, difficulty of 
swallowing followed by flatulence. As soon as the tongue is loaded, the pulse is frequent and feeble. In the early stages it may be taken for scarlet fever. But there is no active 
fever, nor eruption of the skin, nor redness of the papillae of 
the tongue, and when the patient recovers, no disappearance of the 
membrane as is constantly the case in that disease.

The prognosis in these cases is unfavourable. This 
disease generally terminates life by extending to the air pas-
sages and producing effusion in the glottis, which specially 
tends to cause death.

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 to keep the bowels open. The writers also speak highly of the chloride of potash adminis-
trated in the same way as in scarlet fever. To this may be 
added the preparations of ammonia. Quinine has also been 
highly recommended, with good effect. In some instances, 
the cases have been kept in a local treatment. Two remedies have been generally 
employed, nitrate of silver and chloricine. The nitrate of 
silver is applied in the proportion of one drachm to an ounce 
of water on a sponge several times in the course of the day.

Dr. Watson recommends the use of a solution of 
chlorine in water. This relieves the fetid smell which is 
very disagreeable to the patient and those around.

This disease occurring in districts, and attacking in su-
cession the members of a family, has led to the conviction 
that it is contagious. As it is so dangerous a disease, it is 
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.

Guarnaschelli in 1821, by veterinary surgeons to 
a disease affecting horses and cattle. It appears in the 
form of a suppurative disease of the mucous membrane of 
the nose and of a suppurative eruption. The former is sometimes 
called glanders and the latter farcy, but the two often occur-
together. The glanders is the result of an attack of the 
other. 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 chancre-
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 
putrid ulceration appears upon the skin, followed by sup-
putrating bloody or gangrenous ulceration in various parts.

These symptoms may be either acute or chronic. In the acute 
case the pain is severe, and the disease is quickly fatal. 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 distressing affection of the abcesses or ulcers.

At the same time a discharge takes place from the nostrils of a 
matter more or less purulent, viscid, and mixed with blood. The 
eyelids frequently become tumefied, and discharge a thick 
serous exudate. A matter, that is to say, is formed and 
empties itself. The patient is accompanied by 
pro 
and intermittent. The tongue is at first loaded with white 
se, which afterwards becomes brown or black. Diarrhhea 
and tympanitis often come on in the course of the 
disease. This disease is generally fatal from the seventeenth to the 
thirty-first day. In the chronic cases the febrile symptoms 
are not so severe. They last about a month. A twelvet, when their 
ahed has been known to elapse before a patient has recovered or died.

There is no doubt that these symptoms are the result of a 
poison introduced into the system of man from the horse. 
In all cases contact with glandered horses has been ascer-
tained, and in the horse the disease has been traced to the 
lower parts of the body. Matter has been taken from the ulcers and mem-
embranes in men and horses have been inoculated, and the 
disease has been produced. The disease has also been pro-
duced 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 should be kept as far as possible from the houses of 
the sick and healthy, and the dwellings of men who have 
had contact with them should be kept perfectly isolated.

Mr. Turner inoculated two young donkeys, and in one of 
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 they became swollen on the third day, and 
the discharge took place on the sixth. Cases have 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 
course.

This disease in its acute form is very fatal. Of fifteen 
cases recorded by Rayer only one recovered. Of the treat-
ment, therefore, little can be said as a matter of experience.

The general symptoms in the latter stages are those of low 
malignant fever, and a stimulant plan of treatment is indi-
cated.

Cased have been bled, and the blood was buffed 
and cupped, but there is no reason to believe that the bleeding 
did any good. In the chronic forms of the disease recovery 
are more frequent. The symptoms indicate the necessity of a 
general treatment.

Microscopic Diagnosis. The recent improvements in the 
construction of the microscope have not only rendered this 
instrument necessary in physiological and pathological in-
vestigations, but essential as a means of diagnosis in many 
diseases of the human system. The very general 
requirement 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 Microscope, Urns or, in the second 
supplement of the 'Penny Cyclopaedia.' In the present 
article the application of this instrument to the diagnosis of 
diseases will alone be referred to, and the subject may 
be divided under the heads of Diseased Structures and 
Diseased Secretions.

Diseased Structures.—1. Cancer. The distinction be-
 tween cancer and other forms of growth 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, although the mind may 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 alteration, it has nevertheless thrown great 
light on the subject. Cancer exudation generally presents three forms, which, however, are con-
stantly found running one into the other. These have been
named squilimus, encephaloma, and colloid cancer. In all these forms certain cells are discovered by the aid of the microscope, called cancer-cells. These cells may be round, oval, cunoid, spindle-shaped, oval, long, square, heart-shaped, or of other indescribable forms. In size they vary from 4 to the 6th of an inch in diameter. The cell-wall when young is smooth and distended, but when old it becomes roughened and less translucent. 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 colloidal matter. The addition of young water makes the cells become enlarged by its absorption into their interior. On adding to them acetic acid, the young cells become absorbed, whilst the older cells are rendered more transparent, and the nuclei remain unaffected, or become thicker from contraction.

In squilimus these cells are found either in distinct cysts or isolated amongst a mass of filaments which vary in size, and run in different directions, sometimes forming waved bands, and at others an inextricable plexus. In encephaloma 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 hemangina. This form is also to consist of a fibrous structure, but which is so arranged as to form argole or loculi, which are filled with a gray or amber-coloured glutinous matter. This matter is sometimes quite fluid. Sometimes it presents the nucleated-cells characteristic of cancer.

Sometimes the cancerous matter is found mixed with oil globules, and crystals of cholesterol and margarine. At other times it becomes hardened by the deposit of calcareous substances. This indicates the tendency of the cancer to assume the forms of fatty and mineral degeneration. (Bennett, 'Principles and Practice of Medicine.')

2. Tubercle. This form of diseased structure is found in the lungs and other organs. The generative tubercle presents a yellowish or dirty white colour, and has a consistence varying from that of cream to a substance resembling tough cheese. A small portion squeezed between glasses and examined under the microscope presents a number of irregular-shaped bodies approaching a round, oval, or triangular form, varying in their longest diameters from the 4th to the 6th of an inch. These bodies contain from one to seven granules, are unaffected by water, but rendered very translucent by the mercure. (Bennett.) These bodies are called tubercle-corpuscles, and are mingled with 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 bodies are found in the mass, and the majority of the irregularly-shaped bodies 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 lung, 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 'Leucocythermia,' 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. (Bennett, 'Diseases of the Skin.')

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 cunoid or flattened shape. They do not aggregate together in the usual 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 amnini and liquor albus have been observed to contain a large number of granules. In these conditions also the blood-cells frequently present nuclei in their interior.

Cholera the blood has been observed to undergo a remarkable change. As stated by Bennett, 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 were irregular. The diameter of the corpuscles varied from the 6th of an inch, and their transverse diameter about the 6th 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 the surface. These changes have not been observed in all cases, but 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 plethora, fever, or acute inflammation. These changes have not been observed in all cases, nor have they been sufficiently accurately described to be relied on at present as a means of diagnosis.

4. Pus. It becomes sometimes a matter of considerable diagnosis to detect those cells present in the gland or in discharges from the human body, as when present they indicate the occurrence of suppuration, sometimes in parts of the body which cannot be observed. Normal or good pus, as it is called, consists of numerous corpuscles floating in a clear liquid. The corpuscles are globular in form, with a smooth margin and a finely granular surface. They are exceedingly like the white blood-corpuscles in their general appearance. They vary in size from the 4th to the 6th of an inch in diameter. They generally contain in their interior a nucleus, and are surrounded by a thin film on the addition of water, and the rough surface of the cell also becomes smooth. The nuclei are liberated from the cell by the addition of acetic acid, in the form of two, three, five, or more, each of different sizes. Occasionally the pus-corpuscles are surrounded by a second membrane. At other times they are not perfectly global, presenting a greater or less irregularity of their margins, and accompanied with granules and molecules. This occurs is pus from various 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 vomit. The microscopic appearance of the microscope to these matters has been the discovery of a plant which has been called Sarcina Ventriculi. 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 Lobelia Medical, and other poisonous substances, have been discovered. It is also a matter of interest to ascertain the nature of the food taken by children or inconsiderable persons who can give no account of themselves, and this can be done by the examination of the vomited matter.

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. Conferre and fungi have been found in the faces, 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 diseased conditions of the membranes of the intestines. In cholera the rice-water evacuations consist of mucus and the remains of epithelial cells. The nature of food of an injurious character may frequently be discovered, by the aid of the microscope, in the fecal matters.

7. Plants. The lower forms of plants, belonging to the orders Conferre and Fungi, frequently accompany diseases of the body. These are mentioned in the article Ecorrhiza, S. 5.
sclerotic heads of 

A. Insectivorous States : 

B. Immature States : 

Cysticerium cellulosae. 

Cysticerium tenellidix. 

Echinococcus multilocularis. 

Echinochococcus polypodiolaris (E. vertonatorum). 

Echinococcus illitispinae (E. hominii). 

Acephalocystis. 

Family TETALOMATA. 

Distoma hepaticum—Fluke. 

Distoma lanceolatum. 

Distoma buxii—Buik's Fluke. 

Distoma hederophyta. 

Distoma hematobium. 

Distoma opalirnuthro. 

Distoma ronc's. 

Posytoma pinguiculata. 

Section NEMATOMA—Round Worms. 

Family GORDIAE. 

Filaria tobinis—Guanes—worm. 

Filaria oculi humami. 

Family NEMATODORIDE. 

Aescarii lumbricoidei—Round Worm. 

Oxyuris vermicularis—Thread Worm. 

Trichocephalus diopetr (Mature Stage). 

Trichina spiralis (Immature Stage). 

Strongylus gigas. 

Strongylus longirostratus (Filaria bronchialis). 

Strongylus equi. 

Angiostrongylus. 

Angiostrongylus duodenale. 

Dactylius acutaas. 

The most important point made out in the history of these creatures is that the eggs which they pass from one animal body to another, and that the whole group of what are Cystic worms but immature states of the more perfectly formed worms. The history of the common tape-worm (Tentia solium) of the human body may be taken as a type of the whole. The eggs of this worm are contained in the segments of the mature worm, which are called progloti- 

ides. These eggs, in order to their future growth and development, must be swallowed and submitted to a process of digestion by some other animal before they reach maturity. This process may occur in many species of animals, but that in which it takes place most commonly is in the pig. In the intestines of the pig the egg becomes an embryo, which is supplied with six hooks, by means of which it penetrates the tissues of the intestines, and during the blood-vessels is carried by the current of the blood to the various organs of the body. This embryo having reached a place of rest, is developed into the cystic worm known by the name of Cysticerium cellulotae. This form of the worm is well known, and produces in the flesh of the pig that appearance which is called in the markets "mealy pork." Here it remains and dies, unless the flesh containing it is eaten by some other animal. When eaten by man and submitted to the process of cystic worm, it is further developed. In the cyst there is a head called the "Scolex head," sup- 
plied with suckers and hooks, adapted to laying hold of the mucous membrane of the intestines, which, when effected, results in the growth of those segments which are known as the characteristic of the tape-worm. The scolex head is now the head of the tape-worm, and the segments are the proglot- 
ides which continues to increase, and eventually each segment is developed into a sexual being, containing both the male and female organs of generation, and the eggs are produced. These facts have been well established by expe- 
riments made by both Von Siebold and Kitchemeister. Man is also subject to the attack of cystic worms, Echinocoe- 
coccus, &c., which attain their mature development in other animals. The tape-worms of the lower animals have the same origin, and their history has now been traced in a large number of animals. Other forms of worms have been found to undergo similar changes in their larval conditions. The common fluke, which is sometimes found in the liver of sheep, commences its development from the stomach to the intestine Aescarii, being swallowed by fresh water mollusca undergoes a further development before it enters the stomach of the sheep, and becomes developed into the fluke in its liver. The Trichina spiralis, a little worm found in the intestines of a great variety of animals, is now believed to be the early stage of the growth of the Trichocephalus diopetr, a very frequent inhabitant of the intestines of man. The mature and immature forms of these worms found in man and some of the lower animals, are exhibited in the following diagram :—

Section PLATYELM—Flat worms. 

Family TRIADIFS—Cestode. 

A. Insectivorous States : 

B. Immature States : 

Cysticerium cellulosae. 

Cysticerium tenellidix. 

Echinococcus polypodiolaris (E. vertonatorum). 

Echinococcus illitispinae (E. hominii). 

Acephalocystis. 

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3 U
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>
</tr>
</thead>
<tbody>
<tr>
<td>Tenebria</td>
<td>Pig</td>
<td>Man</td>
<td>Cat</td>
</tr>
<tr>
<td>Tenatodes</td>
<td>Rat, mouse</td>
<td>T. crassicollis</td>
<td>Dog</td>
</tr>
<tr>
<td>T. modestata</td>
<td>Rodent-like</td>
<td>T. tenuis</td>
<td>T. mascellata</td>
</tr>
<tr>
<td>T. malayana</td>
<td>T. malaiana</td>
<td>T. t. tenuis</td>
<td>Dog</td>
</tr>
<tr>
<td>M. m. m.</td>
<td>Mole, field-mouse</td>
<td>T. taeniorhynchus</td>
<td>T. t. tenuis</td>
</tr>
<tr>
<td>T. japonica</td>
<td>Sheep ox</td>
<td>T. crassicollis</td>
<td>Dog</td>
</tr>
<tr>
<td>T. susanorum</td>
<td>Dog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Necator</td>
<td>Man, domestic</td>
<td>T. coecum</td>
<td>Dog</td>
</tr>
<tr>
<td>Necator simiae</td>
<td>Man, T. coecum</td>
<td>Nematodea</td>
<td></td>
</tr>
<tr>
<td>Trichinella</td>
<td>Fresh water mussels</td>
<td>D. hepatica</td>
<td>Sheep, man</td>
</tr>
</tbody>
</table>

Nematodea

Trichinella spiralis

Man

[...]

The practical conclusion to which these researches lead, is the necessity of preventing the introduction into the system of Dysenteria E. V. of the future forms of these worms. The eggs of the various forms of tape-worms which produce the cystic states of the worm, are introduced into the stomach by water, salads, and all kinds of uncleanly food. The cystic worms themselves are introduced through the medium of raw and partly cooked flesh, especially pork, which should be carefully avoided.

PICKERED. [Yorkehill.]

PICOLINE. [Chemistry, S. 2.]

PIRIC ACID. [Chemistry, S. 2.]

PIROXANE. [Chemistry, S. 2.]

PIRYLE. [Chemistry, S. 2.]

PICON. [Cambridge, S. 2.]

PIETERMARITZBURG. [Natal, S. 2.]

PISTOL-FISH. [Centrogonus.]

PINDAR, PETER. [Wolcott, John.]

PINOIITE. [Mineralogy, S. 1.]

PIPE-FISH. [Stronghosthis, S. 1.]

PIROLINE. [Chemistry, S. 1.]

PIISS. [Fish.]

PISSANTE. [Mineralogy, S. 1.]

PITCHELONDE. [Ultramarine, S. 1.]

PLACERVILLE. [Natal, S. 1.]

PLACODINE. [Mineralogy, S. 1.]

PLAGIONITE. [Mineralogy, S. 1.]

PLAICE. [Pisces, S. 1.]

PLATEN. [Diestor, S. 1.]

PLASTER OF PARIS. [Gypsum.]

PLATA, LA, STATES OF. [The historical notice of the Argentine Confederation has been brought down to 1856 (Plata, La) when Rossa had been created governor, or to be general-capitán, 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 commonwealth, and the execution of the Confederation, being at the same time guarding out of its business with foreign nations. Rossa had previously served as governor and captain-general of Buenos Ayres for the usual term of three years, and had obtained univalved influences 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 provinces began to recover from the effects of the long prevalent anarchy. But cruelty and despotism marked his sway at home and abroad, and it continually prompted him to endeavour to extend his influence and augment his power. 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 province the monopoly of the trade of the Plata, by a political policy to obtain a like territorial superiority. On the death of Francis, diezator of Paraguay, he refused to acknowledge the independence of that power, insisting that he should join the Argentine Confederation, and at the same time he resolved to allow 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 Rossa was at war. These powers applied for assistance to Brazil. The war was prolonged, and the country was in a state of confusion and the Paraná was in a state of blockade. On the earnest appeal of the merchants and others interested, Great Britain volunteered her mediation, but it was rejected by Rossa who marched his troops within a few miles of Monte Video, which was at this time the only place of blockade. The emperor of Brazil now interfered, and sent a special mission to request the intervention of the courts of London and Paris. The British and French governments in February, 1848, decided on sending envoys to the Paraguay, to place the three nations in a state of mediation, and to announce their intention to enforce a cessation of hostilities if needful, by an armed intervention. The offer was rejected by Rossa, but readily accepted by his opponents. The united fleet of England and France at once commenced operations by seizing the fleet of Rossa which was blocking Monte Video, and the island of Martin Garcia which commands the entrance of the Paraná and the Uruguay. The harbour of Buenos Ayres was at the same time the object of the war. Rossa had caused the entrance to be prepared to open the Paraná and convoy as far as Corrientes any merchant vessels that might desire to ascend that river. Rossa on his part had made haste preparations to intercept this fleet by planting batteries with parks of heavy artillery at Pointe D’Honneur, and in level with the river, supported by 24 vessels and 10 fire-ships. On the 19th 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, and이며 the passage of the river. On the return of the fleet, with a convoy of 110 vessels, it was encountered at San Lorenzo by a very powerful battery which Rossa had erected in an admirable position, in the full expectation of destroying the enemy, and as a means of rendering the capture of the river, supported by 24 vessels and 10 fire-ships. On the 19th 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 overrunning the army of Rossa. On the return of the fleet, with a convoy of 110 vessels, it was encountered at San Lorenzo by a very powerful battery which Rossa had erected in an admirable position, in the full expectation of destroying the enemy, and of marking the capture of the river, and the surrounding country. The battery commanded the river, and was difficult of attack by the steamer, but it was speedily silenced by a rocket-boat, which had been the previous night secretly landed on a small island in the river. The combined fleet escaped with trifling loss, the rocket-boat lost not a man; but four of the merchant vessels with which, through unskilful piloting, ran sabores, were burnt to prevent them falling into the hands of Rossa. The loss to the Argentine army was very great. Again plenipotentiaries were sent out by the combined powers, but Rossa refused to yield, and England withdrew from the blockade in July, 1848. It was however continued by France until January, 1849. On the final withdrawal of the two great powers in 1849 there commenced a new period of active interference. The country of Rossa, essentially despotic, and devoted to the maintenance of the supremacy of Buenos Ayres, had moreover become intolerable to the provinces which desired a federal form of government. Accordingly, towards the close of 1848, Brazil, Uruguay, and Paraguay entered into a treaty, to which 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 Rossa, "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 army commanded by Urquiza crossed the River Plate. The struggle was long. General Urquiza, after deposing Rossa, commanded the army of Rossa 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 forces, numbering 70,000 men, crossed into Buenos Ayres. A general engagement was fought on the plains of Moron, February 9, 1851, when the army of Rossa was entirely defeated. Rossa, who commanded the army, attempted to escape by crossing the river, succeeded in landing on the opposite bank, and in the dress of a peasant, he reached in safety the house of the British minister at Buenos Ayres. From thence, with his brother, he proceeded on board H. M. steamer "Rattlesnake," on the 10th of February sailed in the "Rattlesnake," on the 10th of February sailed in the Conflict steamer for England. But the fall of the tyrant did not bring peace to the unhappy country. Urquiza, by the governors of the pre-
PLA 515  PLU

Vinces assembled at San Nicolas, was invested with the
chief post, and appointed Provisional Director of the
Argentine Confederation. The Congress of Buenos Ayres, however, declared against him, and pro-
tested against the proceedings of the convention, on the
ground of the superior privileges of Buenos Ayres being
meracned. Urquiza died 1853; 1-2, orthodox; suspended. Nuts elevate, with a persis-
tent style. Seeds usually solitary and albaceous; radicle
inferior. They are natives of the Levant and North America
northward. They are tree plants, but their timber is not
endurable. There is but one genus (Platanus) in the order and six species. [Plana.] The family resembles Arceaeoideae and
Althaeae.

POTYSTERON. [Tomatoes.]
PLEASING, AT LAW and IN EQUITY. Although
modern Statutes have made several alterations in the pro-
cedure of the Superior Courts both of Law and Equity, the
outline of the system prevailing in the Courts of Com-
mon Law, which is here described, in Plummer's
System, xviii, p. 245, et seq, is still substantially accurate. The more important changes
affected in the procedure of the Common Law Courts have
been mentioned under ABETMENT [S. 2], INTUITION [S. 2], and MANDBANUS [S. 2]; those in the Court of Chanery
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.

PLAGA, a genus of Plants belonging to the alliance
Aglaia, the order Coraceae, and the sub-order Sphaero-
cocceae. One of the species, P. Helminthocorrum, is called
Coriscan Moss, and has a considerable reputation as a ver-
montal remedy for liver and indigestion.

PLUMBO-CALCITE. [Mineralogy, S. 1]
PLUNKETT, WILLIAM CONYNOHAM, first LORD
PLUNKETT, of Newton, County Cork, was the second son of the
Rev. Thomas Plunkett, a Presbyterian minister at Ennis-
killan, in which town 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 consider-
able fortune. William was still a boy when his father died,
leaving the care of his family to the piety and zeal of his
congregation. His dying request was not in vain, and the
sacred administration of the Christian mysteries was
sent to Trinity College, Dublin, where he obtained a 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 1797. He had already
gained some reputation by his speeches delivered in the
debating club of the university, then known as the Historical
Society; and the late Earl of Charlemont soon afterwards
introduced him into the Irish Parliament, as member for the
brave. Mr. Plunkett commenced his public career by bold and
sarcatic oratory, reserving himself almost entirely for great
occasions. Hence his name is but little associated with the
every day business of legislation; the fame which his
speeches in the House of Lords have acquired is but little connected with the seal with which he opposed the legislative
Union in 1800. The vehement oratory with which he de-
ounced the ministry on this occasion, proved the means of
increasing his professional engagements in the Irish courts of
law. His reputation for eloquence and acuteness was not
repaired, 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 Cath-
erynna, daughter of Job O'Sullivan, Esq., who had repre-
sented the county of Donegal in Parliament. 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 moved to make this public observation of
being concerned in their unhappy proceedings. The accu-
sation however was shown to be unfounded.

In 1803 he was appointed solicitor-general for Ireland, from
which he was removed in 1810 to that of attorney-
general. In the following year, he was appointed Solicitor-
with his son at the head, 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 Asso-
ciation to press upon them the notice of granting Roman Catholic emancipation. Of this subject, Mr. Plunkett
never was an easy and energetic advocate. The death of Mr.
Fox having broken up the Graveline administration in 1807,
Mr. Plunkett, back in the good graces of his friends, pursued
his chancery practice with such success, that for several years
he was engaged as leading counsel in almost every important
Irish chancery suit, and rapidly accumulated a large fortune.

Mr. Plunkett first entered the British House of Commons in
1807 as member for Midhurst. In 1812 he was elected to represent the University of Dublin, which at that time
returned only a single member; and he was re-elected in
1818. On his first speech in the House of Commons he
at 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 in Ireland, the Marquis of Lond-
onderry, and among others 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 of the insurgents in the south of
Ireland. Early in 1837 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 com-
mon pleas. He assumed the duties of the judicial reform
which was to be one of the most momentous events to call forth. But it was otherwise in the English
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 its 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. Leonards). He ultimately only resigned the
chancellorship a few months before the removal of the Liberal
ministry. The liberal measures of that administration
he was induced to resign 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 Plun-
ket, is also a person of note.

On the whole, nature 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 he should not have obtained some share of
his previous fame. His reputation shot upwards from a narrow
ground-work. His speeches were at once few and famous;
more striking instances of perverted talent, and personal advantages thrown away, than that of Edgar Poe. Two small volumes of tales and one of poetry, besides the 'Eureka' already mentioned, are all that remain of him.

POLAND. The Empire of Russia, by a ukeu, dated August 2nd, 1862, to President Maciora, President of Congresses, 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 1861:

<table>
<thead>
<tr>
<th>Government</th>
<th>Old Province</th>
<th>Square Miles</th>
<th>Population in 1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warsaw</td>
<td>Mazovia</td>
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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 NORTHERN WEST PASSAGE, S. 2; those which are situated on the other sides of the North Pole are described under their respective names. The great American ice front in the Arctic Ocean is the subject of the article AMERICA. [For NORTHERN PASSAGE, S. 189, and AMERICA.] It only remains to notice certain conditions of the countries and seas which surround the North Pole. The discoveries which have been made in the seas surrounding the South Pole are narrated in the article SOUTHERN POLAR COUNTRIES.

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 large archipelagos which are separated at about 66° 30' N. lat. and 66° 30' S. lat. At the Poles 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 quantities 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 15th. At the Arctic Circle, the extreme northern point of Greenland, and at the North Pole, the sun is 24 hours above the horizon; and the reverse at the South Pole.

The Polar Regions arise from the sun's rays striking the earth obliquely, as at the equator the heat is produced by the sun's rays falling upon the earth vertically.

The two great continents of the Northern Hemisphere terminate towards the North Pole near 70° N. lat., which probably may therefore be considered as the general boundary-line of the North Polar Sea. The lands comprised within this polar basin, besides the northern shores of Europe, Asia, and America, include the part of Greenland and Nova Zembla, the islands of Spitzbergen, the Lofoten Islands, and the great mass of islands which lie opposite to the northern coasts of British America. The North Polar Sea has only one entrance from the Pacific Ocean, by Behring's Strait, the narrowest part of which, between East Cape and Prince of Wales Cape, is only about 18 miles across. From the Atlantic Ocean, besides the great entrance by Spitzbergen Sea, it is now known that there are entrances by Smith's Sound from Baffin's Bay, and by the Wellington Channel from Barrow's Strait.

A large portion of the Arctic Ocean is constantly filled with extensive fields and moving masses of thick and impenetrable ice. This portion seems to extend round the Arctic Circle, where it is divided by the submarine barriers of Novaya Zemlya, the northern part of Greenland, and the Lofoten Islands. In an easterly direction it extends from the north point of Nova Zembla to the western side of Melville Island. Here the navigation westward up Barrow's Strait ceases, the 'pack-ice,' as it is called, pre-
senting an impassable barrier. On entering the Arctic Ocean from the Pacific through Behring's Strait, the most daring and skilful navigators have not been able to penetrate much farther in a northerly direction than 70° N. lat. Captain Cook, in his last voyage, after passing through Behring's 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 eastward and proceeds towards Spitzbergen, he passes through Terra Nova, the bread 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 Baring Island, may turn northward and try to advance towards the Polar Sea by following either of the tracks of Captain McClure.

The great entrance to the Arctic Ocean by the Spitzbergen Seas is not attended with much difficulty. Ships sail every year from the shores of the Atlantic Ocean to Archangel, 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 70° N. lat.; and others much smaller go every year from Hammerfest and other places to fish for walruses along the western shores of Spitsbergen. Barents, the Dutch navigator, in 1594 and 1596, traced the western shores of Nova Zembla as far as North Cape, 70° N. lat.; and the Russian navigator Ziwolks, who in 1636 surveyed the island of Nova Zembla, found no difficulty in sailing around Cape North, 70° N. lat., to the eastern coast at 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 Seas appears to depend upon the 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 entirely shut out, and in many parts dangerous. At North Cape, in Europe, 71° 10' N. lat., the mean temperature of the year is 32° Fah.; at Bear Island (Cherry Island), between North Cape and Spitzbergen, 70° 45' N. lat., it is 38° Fah.; but opposite the coasts of Siberia, farther to the east, the floating masses of ice render the navigation so dangerous that some of the ports of the line have not been surveyed. This tract includes the most northern point of Siberia, Cape Severo (Severo Vostochinni Nosi). In this part of the Polar Basin are the Liakhov Islands, the largest of which are named Kotelnof Fadiseifako, New Siberia, and Liakhov. They are situated between 73° and 76° N. lat. On these islands the snow does not entirely melt even in summer, and there is no vegetation whatsoever. It is not to be wondered at that in winter the large body of the sea is free from ice at certain distances from the shore. North of New Siberia and Kotelnof the distance is less than 20 miles. Farther eastward, near Wrangel Island, the distance is about 170 miles distant; but between 175° and 180° E. long., opposite Cape Yakan, it is only about 4 miles distant. At Ustyanik, in Siberia, near the mouth of the river Yana, 70° 55' N. lat., the mean temperature of the year is only 4° Fah. At Winter Island, on the north-eastern coast of America, in 66° 11' N. lat., 83° 30' W. long., the mean annual temperature is not more than 7° Fah., while on the south shore of Melville Island, about 74° N. lat., the mercury of the thermometer is frozen every winter during four or five months.

That there is a great sea comparatively unincumbered with ice in the vicinity of the North Pole, and perhaps flowing over it, seems to have been rendered probable by many facts and circumstances. Barents, in 1594, remarked, "as soon as we made from the land [Nova Zembla] and put more into the sea, although it was much farther northward, presently we felt more warmth." Captain Parry, in his attempt to reach the North Pole in 1857, leaving his ship, the Hecla, marooned on the fast ice, was able to proceed with his party over the ice, dragging the boats and sledges which had been constructed for the purpose. On July 27th they reached 85° 45' N. lat., 19° 35' E. long., when they descended the island, and the next morning took the ice over which they were travelling northward was itself drifting southward, they relinquished their attempt, and commenced their return-journey. On August 12th they reached Little Table Island, or rather a rock north of it, which Captain Parry named Rose's Isle, and which is the farthest land known in the northern hemisphere; it is in 80° 47' 30" N. lat., 20° 34' E. long. Captain Parry and his party were absent from the Hecla 61 days, the distance traversed being 324 miles. On July 16th, being in 88° 17' N. lat., it raised incessantly for 31 hours. On July 16th the temperature was 37° Fah. in the shade. "In the evening it was so warm in the sun, though the temperature in the shade was only 35°, that the tar was running out of the seams of the boats." This great open sea is not a great distance when they were farthest north. After the middle of July no ice entered the bay where the Hecla was moored, and for some weeks afterwards not a piece was seen in the vicinity.

In further confirmation of there being a great sea in the vicinity of the North Pole, it may be stated that Sir Edward Belcher saw an extensive sea with little ice north of the Wellington Channel, as did also Captain Penny north-west of the Victoria Channel; that Captain Inglefield saw that sea north-east of Whale Sound, near the head of Baffin's Bay, and also north of Smith's Sound, which is an outlet into the Polar Basin from the head of Baffin's Bay. The same extensive open sea was seen by Dr. Kane from a position still further north of Smith's Sound than that which was attained by Captain Inglefield.

The difference of temperature between the north-western shores of Europe and the north-eastern shores of America is owing to two main causes—the Gulf-Stream, and the drifts of the ice masses from the Polar Basin. The Gulf-Stream is a great warm current many miles in width, which flows in a north-eastern direction from the Gulf of Mexico across the Atlantic, and passing by the British Islands, north of the Polar Basin, reaches the Polar Sea as far as the northern shores of Spitzbergen and Nova Zembla. Here in the spring it meets the powerful current caused by the breaking-up of the ice in the great rivers of Siberia. As this vast body of water and broken ice advances towards the shores of Nova Zembla and Spitzbergen, the Gulf-Stream opposes its farther progress south and gives it a direction westward, so that it passes by East Greenland and Iceland, and reaches the shores of America and New-Foundland, in 60° W. long. and 60° N. lat. (in length and of great thickness) descends in the spring as low as 40° N. lat. On the coast of Norway, on the contrary, as far as 71° N. lat., not a piece of drift-ice is ever seen.

The countries which surround the North Pole generally afford an abundant supply of animal food, consisting of the walrus, the polar bear, the moose-deer, the rein-deer, the wolf, the polar hare, and the seal. The number of aquatic birds is very large, and various kinds of fish are in great abundance.

POLEVY, NIKOLAY ALEXIEVICH, one of the few distinguished authors whom Siberia has yet produced, was born on the 22nd of June (old style) 1796, at Irkutsk. His father, who was a merchant, settled for some generations at Kurak, where the names of Polevoy and Golikov are excessively common, had been left an orphan at the age of thirteen, and sent to Tobolsk in the employ of a relation of the name of Golikov. Most of the elder Polevoy's life was spent in commercial enterprizes in Siberia, and at one time he had the prospect of making a fortune by establishing a new company for commerce with Russian America, but the union of the two old companies, which had taken place in 1808, he set up a manufacture of earthenware at Irkutsk, and "he used," says his son, "to pronounce with enthusiasm the name of Wedgwood." In assisting in the business of this manufactory, and of a brandy distillery with which his father was also connected, the early years of Polevoy were passed. He never apparently received any schooling; he seemed to read from an elder sister at six years old; at eight he used to read aloud to his mother novels, and to his father the Bible, and the 'Moscow News,' and the Fateshekov newspaper; and amused himself by composing a manuscript of a paper (in imitation of the 'Moscow News' ['Monokovskii Vedomosti']), which he called the 'Asiatic News' ('Asiatskii Vedomosti'). The father was in the habit of boasting of his relation to the history of Peter the Great in thirty volumes, and the boy formed the singular project of writing additions to a work already so voluminous. He also tried his hand at composing plays, and produced a drama, 'The Marriage of the Tsar Alexis Mikhailovich,' and a tragedy, entitled 'Blanche of
Bourbon. "At last," says Polevoi in the autobiography prefixed to his 'Ocherki Rosskoi Literatury,' published in 1839, "I became more interested in the history of my country, and, of letters and history, for my memory at that time was such as I have 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 all that was published, and I knew and remembered all that I read from the verses of Karamzin, and the articles in the 'Courier of 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 Irkutsk, and I was a good talker. I was the first and only Russian
agent of his quitting Irkutsk, passed through all Siberia, saw a play for the first time at the theatre of the great Makariev, and on his arrival at Moscow spent much of his time at the theatre and the bookshops, wrote tragedies and romances, and was unwillingly recalled to business and the brandy distillery by the arrival of his father. This took place in June 1812, and both business and pleasure were soon at an end in the devoted city, where the configuration was familiar, and he was fugitive from before the army of Napoleon I. For a few weeks after this Polevoi was almost in constant movement from St. Petersburg to
Irkutsk, and from Irkutsk to Kursk, and his literary ardour, deadened by the reproaches of his father, who now wished him to return to Moscow, and the losses and debts of his parents, was extinguished. It suddenly revived when he was about eighteen, a clerk at Kursk; but the main cause of its renewal, according to his own account, was his discontent with his then situation and its limited prospects, and his conviction that in Russia there was no other way to consideration for a poet except in his position but through learning and literary success. Himself and his younger brother, Xenophont, began to study French and German in secret, devoting many hours of the night to these studies. He took up 'Imitation of Jesus Christ,' and began to bring it into a new world of reading. In 1817, when the Emperor Alexander paid a visit to Kursk, Polevoi 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 Zhukovsky, Gribboyedov, Grech, and Bulgarin; and in 1826 he commenced at Moscow the publication of a magazine entitled the 'Moscow Telegraph.'

For the twenty-one years that followed, Polevoi was in incessant literary activity. The 'Moscow Telegraph' soon made itself conspicuous by the vigour and spirit of its remarks on the literature of the day; the example was extended to other Russian literary reviews. The new era in criticism from the articles of Polevoi. It was 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 opposed to the Russian government. This was in or about 1835. Polevoi 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 diya Chteniya' for 1846 (vol. lxxvi.), "Polevoi was a journal, an historical and romantic-writer. In St. Petersburg he was both an editor and reader, contributing to several journals; he composed romances, tales, essays, translations from Shakspeare, and such a multitude of dramas, tragedies, comedies, vaudevilles, national farces, and so on, that criticism from abroad was astonished at the number and bulk of his productions, the variety of their character, or the rapidity with which he threw them off." The natural result of the name of Polevoi, which at one time promised to be one of the brightest in the Russian literary horizon, lost much of its luster. For the last ten
years of his life his reputation sunk instead of rising. He died at St. Petersburg, on the 2nd of February 1846 (a.s.), leaving his father and three medical attendants that his constitution was completely worn out by his incessant literary labors. He died in poor circumstances, and left a large family.

The most interesting work of Polevoi is perhaps his 'Ocherki Rosskoi Literatury,' 'Sketches of Russian Literature,' 5 vols. St. Petersburg, 1839. It consists of reprints of select critical articles which had appeared in the 'Telegraph' and elsewhere, on Dovzhavin, Karamzin, Pushkin, and other of the most eminent names in Russian literature. The complete edition of 'Stroitsy i lavki,' 'Government Work and Translation' of N. A. Polevoi ('Dramatischesschi Sochneniya i Pervovodi,' 4 vols., St. Petersburg, 1842-43, comprises only the more popular of his productions, several of which enjoyed a great success. In particular his 'Grandfather of the Fleet' ('Diedushka Rosskogo Flota'), 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 Sibirevschina' ('Parasha the Siberian Girl'), founded on the same historical anecdote which supplied Madame Cottin with the ground-work of 'Elisabeth, or the Exiles of Siberia.' In another play, 'Boldatkovskoe Sredstvo' ('A Soldier's Heart'), he has made the most of his knowledge of the conditions of life in whose life it is founded. Polevoi's translation of 'Hannet,' which was produced at Moscow in January 1837, is unusually close to Shakspeare; not even the scene of the grave-diggers is omitted, and the dialogue passes from blank verse to prose, the same limitations of time that limit Shakespeare being far from successful. His 'Life of Suworov,' or Suvorov, 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 confugration of Moscow, and was finished after his death by his brother in-law, 'Ataman G. Golikov,' who states that the work was finished at Kharkov, where Golikov was Russiani's Secretary, and that Golikov's son, the 'Ataman,' who was at Petersburg at the time, was engaged in finishing the work. This conclusion of this work, 'is not a shapeless mass like the 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 common to European people.' Russia was a nation, it is Russiani, but it is not Russia," or an historical picture of Russia from 1746 to 1846 (9 vols., 1845), 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 Polevoi'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 reader at his death. "Polevoi," says his biographer, "was a Russian man. After all from the original elements of the Russian empire, the Russian mind and the Russian soil, that Peter the Great reconstructed Russia. He still remained a Russian sovereign, and his subject, though fromerwise with the German, remained a Russian man. With his decided tendencies towards western Europe, it is impossible that something supernatural should not find admission, that traces of it 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 glue, inspired with faith in that power, are directed by a single will, on lines which will not these sixty millions do? The future belongs to us. Whenever else comes the fear with which we inspire Europe and the West, the fear from which it strives to remove us, then we come against this darkness as nothing but the rise from a consciousness which is not the consciousness of strength, from a feeling different from that of hope in the future, on which we Russians look with such boldness and such faith.

The establishment of a police force all over England has at last been made compulsory by the Statute
POLISHING SLATE. [MINERALOGY. S.1]

POLPERRO. [CORNWALL]

POLYergus, a genus of Formicidae, separated from Formicini in 1822. A peculiar species of the Amazon Ant. The species are destitute of stings, and have the antennae near the mouth and the mandibles narrow, curved, or very much hooked. The habits of the Amazon Ant, P. recurvea, are very remarkable. The neuters of this species are often carried in the nest of the ant, war upon the neuters of other species of Formicidae, especially C. curvilineus 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. [Art.]

POLYPTERUS, a genus of Fishes belonging to the family Clupeidae. The sides of the upper jaw are immovable; the head is covered with sharpened bony plates; the body is silvery, the scales separate fins on the back; the teeth like a rasp, with long ones in front; the stomach large; a double air-bladder, with large lobes, the left one opening freely into the gullet. There are two species; one found in the Nile, the other in the river of Hong Kong. The neuters can produce a number of living representatives of a large family now extinct. They belong to the large division of extinct fish called Sauroïd, on account of their resemblance to the Lizard tribes.

POLYZOA, frequently termed Bryoza, the animals belonging to the Molluscan Steinkircher, closely allied in some respects with the Tunicata, and especially with the Phyllognatha, especially with the Mucronata, whilst in others they approach the Branchiopoda.

The analogies presented in their structure with that in other Molluscan groups having been pointed out in the article Mollusca, S.3, 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 reason why we have introduced it is the purpose of the present work.
Month, 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 base (fig. 6a). In many cases the wall of the cell is of equal thickness and similar structure throughout, but in the Cheilostomatous 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 rear. Upon this side, the thickest, a greater or less extent of the front may remain wholly or in great measure membranaceous, as in the genus Membranipora (fig. 14); or be filled in by a sculptured or perforated calcareous plate (Cerithium, Leporina, fig. 15), and many others. The space thus defined when left membranaceous (as it appears in most if not all cases to be at an early period in the formation of the cell), is termed the Aperture. The borders of the aperture are sometimes furnished with Marginal Spines. In some instances, as in Cabearea and Scrupocellaria (sp.), the aperture is protected in front by a curious outgrowth from near the margin, which is termed a Pedunculate Operculum. The back of the cell is that part, of course, which is opposite to the front; the mouth is situated at or near the upper part of the cell, and is either terminal or subterminal. Other parts, which may be regarded as appendages to the cells, but which are not universally present, are certain organs, either of offence, defence, or both, as the well-known Avicularia, a form of the avicularia, or a form of a avicularia of a pinch, of the ossicles, or the sponges constituting a long, slender, moveable sets. 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 tube, or tube, 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 avicularian and vibracular organs, in a systematic point of view, may be estimated from the circumstance that, out of 36 genera of Cheilostomatous Polyzoa, 20 include species armed with one or the other, or with both; and that of 101 species no less than 120 are so furnished. They appear to be confined solely to the Cheilostoma.

In many cases the polypide is affixed by numerous slender corneous tubes, which seem to be merely subserous to that portion of the polypide which is the true stalk. The Polypide, or colony itself, is formed 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 Leporina ciliata, and from various parts of the cell, as 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 Cheilostomatous, the cells do not arise in this manner, but from a tube common to several cells, and which is either divided or not into distinct intermedium. 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, each of which contains a polypide, and consists of two portions—an internal tunic, soft, transparent, and contractile (the Endocyst), and an external investment (the Ectocyst). The endocyst lines the interior of the cells and when it arrives at their 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 exertion of the polypide it undergoes eversion, sometimes complete, sometimes incomplete. The endocyst consists of a thin, firm layer of gelatinous tissue (fig. 6b) and the polypide is suspended, surrounded by the perigastric 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 stomach itself). The cavities of the ectocyst, however, are not connected.

The ectocyst and endocyst represent respectively the external and middle tunics of the Tunicata, or the mantle and shell of other Molluscs.

The Endoderm is a simple thin and membranaceous, and often contains transverse muscular fibres. A portion, perhaps the whole, of the inner surface is clothed with vibratile cilia. The ectocyst 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. hippocrepis it is in most species composed of a tough peramentaceous brown membrane, strengthened by the deposition of irregularly formed siliceous particles, sometimes rendering it quite opaque. In other cases again, as in the genus Angiostoma v. Bem., the soft and flexible, and as it were florolcetous ectocyst, is pervaded by aluminous and siliceous particles, and the same is true of the outer layer of Ctenostomata. In Ostracida and Polycystina 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 consists of a lining of organous and transparant, usually free from any earthy deposit. In some instances, and very distinctly in the Solenaridae, or Luniulites, the surface of the calcareous ectocyst is further covered with a thin horny pellicle, apparently resembling that on the shells of many Molluscs.

B. Organs of Digestion.

These consist of an alimentary canal, commencing at the mouth and terminating at the anus; and 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. hippocrepis) furnished with a valve-like organ of very peculiar formation, and which is considered by Professor Allman to be analogous with the 'langue' of the Ascidians.

From the mouth an osophagus, or pharynx, leads downwards into a tube, the intestine, in some cases furnished 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, which in most cases dilates inferiorly into a rounded or more or less pyriform cavity, from which is derived the pyloric orifice.

The pyloric orifice is distinctly villous, and is furnished with 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 corporaces of a brown colour, seated on the wall of the stomach. The mouth and upper part of the osophagus and the commencement of the intestine, 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 perigastric space, which corresponds with the 'sinus system' of the Tunicata, would seem chiefly to devolve the function of bringing under the influence of the gastering medium the nutritive fluid of the tissues.

The tentacular crown of a Polyzoan consists of two portions: 1. a sort of stage, or disc, which surrounds the mouth (fig. 15d); and 2. the lophophore, which are born in an uninterrupted series round the margin of the lophophore. The lophophore throughout almost the entire class is orbicular or annular; but in the Hippocrepis it is not as a rule orbicular, but consists of two triangular lobes, or arches, so that in that order it exhibits the form of a deep crescent. This condition of the lophophore is found in no marine species, and in Fredericia, a fresh-water form, the arms of the
crescent are obsolete, and the lophophore might, on a superficia
view, be regarded as orbicular; but a careful exami
nation, Professor Allman goes on to say, will render manifest
its departure from the orbicular form, the side corresponding to
the arms of the crescent being slightly prolonged obliquely
upwards. In all cases the lophophore forms the roof of the
perigastic space; in the species with crescentic lophophores
the interior of the arms is clothed with vibratile cilia.

The tentacles are tubular, closed at their free extremity
and opening at the other end into the perigastic space. In all
the Polyzoa they are armed upon their opposed sides (in Pe
cellina on one only!) with vibratile cilia, arranged in a single series, and vibrating towards the exterior, projecting from one side and
towards the base on the other. A nervous filament and muscu
lar fibres may be traced into the tentacles. In the proper
P. hippocrepia the entire plume of tentacles is surrounded at
its base by an exceedingly delicate transparent membrane in the
form of a cup or calyx, considered by Professor Allman as
analogous to the membrane of the respiratory sac in the
Tunicata; but this calyx has not yet been detected in any
marine Polyzoa. In the genus Pedeticellina the tentacles are
also surrounded at their base by a kind of membranous calyx,
which is a sort of an investment, attached to the submerged part
of the membrane connecting the bases of the tentacles of the
P. hippocrepia.

The perigastic space and the interior of the lophophore and
tentacular calyx, are filled with thousands of small, oval,
and are filled with a clear fluid, in which float numerous particles
of a very irregular form and size. This fluid obviously
represents the blood or common nutrient and respiratory fluid of other Moluscs. It is kept in motion by the cilia with
which the entire bottom is covered, but there is no special
circulatory organ as in the Ascidia.

D. Organs of Motion.

The muscular system of the Polyzoa is highly developed,
and the muscles are especially interesting in a physiological
point of view, for they seem to present an example of true
muscular tissue reduced to its simplest and essential form.
They are composed of bundles of elementary fibres, totally
separate from each other, throughout the entire body, and
which are distinctly marked with transverse strie. They
resemble in fact very closely the fibres of the thoracic mus
cles of insects. In the marine Polyzoa however another
kind of fibres may be noticed, presenting nodular enlarge
ments, which would seem to resemble very closely the isolated,
organic muscular fibres of the higher animals. These
muscles are disposed in distinct sets, and it is by the agency
of these various groups that the different movements of pro
trusion and retraction of the anterior and posterior ends, as
well as 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. 8 in, the article Mollusca, S. 2.
The curious analogies in the disposition of these muscles in the
Polyzoa, between that of the invertebrate class of the Animal
Kingdom, and those of the Brachiopoda are also pointed out in that place.

E. Organs of Sensation.

A distinct nervous system was first shown to exist in the
Polyzoa by M. Dumortier in Lophophora crystallina, and has
been demonstrated by Van Beneden in Laguncula, and by
Allman in all the hippocrepian genera except Pedeticellina;
it may be deemed therefore to exist generally in the class,
and is probably developed along the same lines, as in all the
species of the hippocrepian order there may be seen,
attracted to the external surface of the oesophagus, 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 ner
vous 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
found near the base of the ciliary filament of the oesophagus that
nothing like a complete collar surrounding the tube has been
observed. The Polyzoa do not seem to possess any special organs of sense.

F. Organs of locomotion.

In Cristatella, the ectocyst, according to Professor Allman,
is highly contractile, and presents, below, a flattened disc,
destitute of spurrers. Upon this disc, which closely resembles
the foot of a Cestodarium, the singular polygonal creeper
about upon the stems and leaves of aquatic plants. Except
in the embryonic condition no other Polyzoa would seem to
carry capacity for locomotion; or at any rate none has
been possessed, but several reasons would seem to render it
probable that a species belonging to the Solenocysta may
be capable of locomotion by means of their curiously
constructed vibracula.

G. Reproduction.

In the Polyzoa, observes Professor Allman, there are three distinct
modes of reproduction, and they are seen to be exemplified,—By buds
or gemmæ; by true ova; and by free locomotive embryos.

1. Reproduction by Gemmæ.—The gemmæ always origi
nate in the endocyst, first appearing as small tubercles
projecting into the perigastic space, but which may soon be
seen to take a decided position in an arc or circle. 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
perigastic space. The polyzoid is gradually developed in
the interior of the gemma 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 polyzo
a, whose ultimate form, as has been before observed,
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 physiogomy of the various species.

2. Reproduction by Ova.—All the fresh-water, and proba
bly also, all the marine Polyzoa, produce true ova, which
sometimes remain formed in a definite form; sometimes
are thrown off in a large number, and are present in the
upper and back part, a polyzoid, consisting of a single series
of cells, such as that of Acaea, or of Hippothoa (fig. 6),
will be presented; if from each cell two are given off and remain
in close apposition, a circularly expanded disc of greater or
lesser regularity is developed, which is the regular endocyst,
which is the regular way of reproduction in the Polyzoa.
In Laguncula Professor Allman says, 'that the ovary and
testes are both found in the same cell. The former is an
irregularly shaped body, adhering to the under 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 in
terior cavity from the ovary. The ovary and testes of this
organ is described and figured by Van Beneden. In
Pedeticellina Professor Allman says, "that the ovary and
testes are both found in the same cell. The former is an
irregularly shaped body, adhering to the under 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 in
terior cavity from the ovary. The ovary and testes of this
organ is described and figured by Van Beneden. In
Pedeticellina Professor Allman says, "that the ovary and
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 do contain an ovum or ova, and that these ova are developed ab origine, 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 ovarious organ should exist in apparently closely allied genera or even species, is at present inexcusable.

Section III. Classification.

The more general relations of the Polyzoa having, as before observed, been described under the head of Molusca, 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 Polypide, the classification of the Polyzoa can only be attempted with any prospect of useful results, from the study of the Polycysto; that is to say, so far as regards the determination of the subordinate groups—the orders themselves being defined by characters derived from the Polyptide, 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-oesophageal ganglion, with branches, but without a nervous ring around the oesophagus; and without any special organs of sense or of circulation. Mouth surrounded more or less completely by a single row of ciliated tentacles.

Bryozoa, Ehrenb., 'Corallen-Thiere des Roth. Meer,' 1831 (1834).
Mollusca Zoophyta, seu Zoophyta Ascidicida, John-
ston, ' Mag. Zool. and Bot.' 1836.
Ophiobrachioidea, Farre, 'Phil. Trans.,' 1837.

Order I. Polyzoa infundibulata, Gervais.

Tentacles disposed on an uninterrupted annular lophophore, surrounding the unarmed mouth.

Sub-Order I. Cheilotomata.

The crescentic subterminal mouth of the cell is furnished with a moveable lip, by which it is closed when the animal retires.

Escharacea, Planocraea, Colograda (ex. Oria), Fleming.
Polyplaxia operculifera et edellaris (ex. Oria), Blain-
ville.
Escharina, Collapsina, Ehrenberg.
Urococata (pars), Hagenow.

A. Cells disposed in a single series.

Family 1. Catenicellidae, Busk.

Cells connected by short flexible tubes.

Gen. 1. Catenicella, Blainv. (Fig. 1, 2.)

Cells connected by short conical tubes, all facing the same way; polyzoary phytod, erect, dichotomously branched; cell at the bifurcation geminate.

a. Fenestrata. Cells fenestratae in front; ovicella terminal, B. Vittata. Cells with a narrow elongated band or vitta on each side in front; ovicella girleriform, not terminal.

Catenicella, Blainville; 'Brit. Mus. Cat.,' p. 3.

Catenaria, Savigny, 'Egypt,' pl. 13.

About seventeen species known; mostly Australian.

Gen. 2. Alysiidum, Busk.

Cells connected by short conical tubes. Two cells arising from each cell at a bifurcation.


Three species known.

Gen. 3. Calpida, Busk. (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 conical tubes.

Calpida, Busk; 'Voyage of Beagle,' l. 364
(fig. 3); 'Brit. Mus. Cat.,' p. 14.

One species.
arsoles; aperture large; no avicularia; ovisells inconspicuous.

Vincaulina, Defrance; Blainv.; Hagenow; 'Brit. Mus. Cat.', p. 96.
Glaucosoma, Goldfuss.
Siphonella, Hagenow.
Cellaria (pars), Reuss.
One recent species; numerous fossil.

Gen. 4. Paracorina, Busk. (Fig. 8.)
Polyselen cuneatus, flexible; margin of aperture much raised; aperture very large; ovisells cuculate, prominent; no avicularia.

One species.

Cells disposed in the same plane, forming linear branches of a dichotomously divided phylloid, erect, articulated polyselen.

Bugulida (pars), Gray.
Cellulariades (pars), Johnston.
Escharides (pars), Johnston; Gray.

Gen. 1. Cellularia, Pallas. (Fig. 5.)
Cells bi-triserial; more than four in each internode; oblong or rhomboidal, contiguous; perforated, unarmed, or very rarely with an avicularium on the upper and outer angle of the cells.

Cellularia (pars), Pallas; Fleming; Johnston (pars); 'Brit. Mus. Cat.', p. 19.

Bugula (pars), Gray; Oken.
Three species.

Gen. 2. Menipea, Lamouroux.
Cells oblong, or elongated and attenuated downwards; perforate 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), Lam.; Solander.
Crista (pars), Lam.
Triangularia, 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 angle, and with a vibraculum behind. Cells biserial and numerous in each internode.

Saccocellaria, Van Beneden; Gray; 'Brit. Mus. Cat.', p. 23.
Bicellaria (sp), Blainville.
Cellaria (sp), Pallas; Johnston.
Cellaria (sp), Solander; Lamarck.
Saccoparia (sp), Oken.
Seven species.

Gen. 4. Canda, Lamouroux.
Cells rhomboidal, situated on the outer side for the lodging of a vibraculum; no avicularium on the upper and outer angle; sometimes one in front of the cell.

Canda, Lam.; Blainville; Gray; 'Brit. Mus. Cat.', p. 96.

Cellaria (sp), Lamarck.
Cellaria, Van Beneden.
Bicellaria (sp), Blainville.
Saccocellaria, Gray.
Cellaria (sp), 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. Cylindraceae, Busk.
Polyzoary dichotomously divided into ligulate bi-multiseriate branches; on the backs of which are vibracula, each of which is common to several cells.

3 X 2
(Fig. 10.)

Cells bi-multiseriolar, in the latter case quinqueserial. 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 decisively with those of the other.


*Salvia*, Gray.

*Bacillaria* (sp.), Audouin.

*Ciliaria* (sp.), Lamarck.

*Cellaria* (sp.), Fleming; Johnston.

Four species.

Gen. 2. *Amastigia*, Busk.

Cells bi-quadriseriolar; vibracula small, resembling avicularia.

One species.


No vibracula; avicularia, when present, pedunculate.  
*Bicellaria*, Busk.; 'Voyage of Rattlesnake.'  
*Bugula*, Gray.

(Fig. 11.)

Cells turbinate, distant. Aperture directed more or less upwards. Several spines, marginal or dorsal.


Cellaria, Fleming; Pallas (sp.).

Cellaria (sp.), Oken; Lamarck.

*Bugula* (sp.), Oken.

Four species.


Cells contiguous, attenuated downwards; much expanded above, with a large plain aperture unarmed.  

*Bicellaria*, Busk.; 'Voyage of Rattlesnake.'

Gen. 3. *Bugula*, Oken.

Cells elliptical (behind), closely contiguous, bi-multiseriolar; aperture very large; margin simple, not thickened.

*Bugula*, Oken; Gray; 'Brit. Mus. Cat.,' p. 43.

*Asellaria*, Lamx.; Blainville.

*Ciliaria* (sp.), Lamx.

*Cellaria* (sp.), Pallas; Johnston (sp.).

*Cellaria* (sp.), Solander; Lamarck.

*Bugula* (sp.), Gray.

*Oriaria* (sp.), Gray.

Six species.


Cells opposite in pairs. Polysomy continuous.


(Fig. 29.)

Cells joined back to back; all the pairs facing the same way.

Gemellaria, Savigny; Van Beneden; Johnston; Gray; 'Brit. Mus. Cat.,' p. 34.

Gemellaria, Blainville.

*Loxocordia*, Lamx.

Notomia (pars), Fleming.

*Locicula*, Cuvier.

*Crista* (sp.), Lamx.; Lamarck.

*Scruparia* (sp.), Oken.

One species.

Gen. 2. *Didymia*, Busk.

Cells joined side to side; no avicularia.

Didymia, Busk; 'Voyage of Rattlesnake;' 'Brit. Mus. Cat.,' p. 35.

One species.

Gen. 3. *Dimotopias*, Busk.  
(Fig. 9.)

Cells joined back to back; aperture oblique; each alternate pair of cells looking the same way.

Dimotopias, 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.


Gemellaria (sp.), Blainville.
Family 8. Flustridae, Gray.
Polyzoary flexible, expanded, foliaceous, erect; sometimes decumbent and loosely attached. Cells multiserial, quinuncial, or irregular.

*Flustra*, Linn.; *Johnston* (pars).
*Flustra*, Gray (pars); 'Brit. Mus. Cat.', p. 46.
*Escharidae* (pars), *Johnston*; *Gray*.
*Polyplacophora* & *Ricca* (pars), *Lamx*.
*Flustralea* (pars), *Lamx*.

Gen. 1. *Flustra*, Linn. Heus. Cells contiguous, on both sides of the frond.
*Flustra* (sp.), *Linn.*; *Lamark*; *Gray*; &c.
Five species.

(Fig. 13.)
Cells contiguous, on one side only of the frond.
*Carbacea* (sp.), *Linn.*; *Johnston*.
*Carbacea*, Gray; 'Brit. Mus. Cat.' p. 50.
Ten species.

Gen. 3. *Diachoria*, Busk.
(Fig. 13.)
Cells disjunct; each connected with six others by tubular processes.
*Diachoria*, Busk., 'Voyage of Rattlesnake.'
Three species.

Polyzoarium adnate, crustaceous, spreading from a centre in a more or less circular form; composed of contiguous, or connected, calcareous, decumbent cells, the wall of which is complete in front.

*Lepralia* (sp.), *Moll.*; *Pallas*.
*Bererina*, *Fleming* (non *Lamouroux nor Pern*).
*Escharina* (sp.), *Milne-Edwards*; *Gray*.
*Escharidae* (sp.), *Milne-Edwards*.
*Cellepora* (sp.), *Oken*; *Audouin* (pars); *Lamouroux* (pars).
*Flustra* (varior).
*Cellepora*, *Lamark* (pars); *Gray* (pars); *Lamouroux* (pars).
*Oribillina*, *Herencia*, *Escharella*, *Porella*, *Cellepora* (all sp.), *Gray*.

1. *Armatia*. 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 polyzoary.

1. *Inarmata*. Species without either avicularia or vibracula.

a. With oral spines.

b. Mouth unarmed.

About fifty or sixty species.

Polyzoarium composed of cells, standing more or less
vertical to its axis or plane, hausted together, or irregularly overlying each other.

**Cephalorhiza**, Johnston (pars); "Brit. Mus. Cat.", p. 68.

Gen. 1. **Cephalorhiza**, O. Fabricius. (Fig. 16.)

Polyzoarium calcareous, rigid, adnate or erect, composed of ureolite, suberect, contiguous cells, hausted together irregularly, or arranged quincuncially. An ascending rostrum on one or both sides of the mouth usually furnished with an avunculinum.

**Cephalorhiza** (ep.), O. Fabricius; Johnston; Linnneus; Müller; Berkeley; Stewart; Lamarck; Lamouroux; Fleming; Olivi.

**Spongina**, Oken.

**Typhora** (pars), Linn.

**Millepora** (pars), Pallas; Ellis and Solander (pars).

**Eschara** (pars), Pallas.

* Adnate, globose, or spreading.

** Erect.

Eight species.


Polyzoary erect, rigid, foliaceous and expanded, lobate or reticulate. Cells disposed quincuncially in the same plane, on one or both surfaces.

**Escharidae** (pars), Johnston.

**Lepraliaceae** (pars), Gray.

**Rugosarme**, Gray.

Gen. 1. **Eschara**, Ray. (Fig. 17.)

Polyzoary foliaceous 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; Lamarck; Gray; Pallas (pars); Moll (pars); "Brit. Mus. Cat.", p. 68.

**Nullidora** (ep.), Solander.

**Cephalorhiza** (ep.), Esper.

* Polyzoary more or less expanded, foliaceous.

** Polyzoary subdivided into branching lobes.

Eleven species.

Gen. 2. **Rugosarum**, Imperato. (Fig. 28.)

Polyzoary foliaceous, calcareous, reticulated. Cells immersed, opening at one surface only.

**Millepora**, Linn. (pars); Ellis and Solander; Esper; Marevige; Cuvier.

**Rugosarum**, Imperato; Lamarck; Risso; Fleming; Stark; De Blainville; Couch; Johnston; Goldfuss (pars); Hagenow (pars); "Brit. Mus. Cat.", p. 93.

**Fenditima**, Oken; De Blainville.

Three species.

Family 12. **Selamiaceae**, Busk.

Polyzoary 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 setae (probably locomotive).

**Selamiaceae**, Busk; "Brit. Mus. Cat.", p. 97.

Gen. 1. **Cupularia**, Lamouroux. (Fig. 18; vide also figs. in **Cephalorhiza**.)

Each cell throughout the polyzoary with a vibraculum at the summit.

**Cupularia**, Lamouroux (proposed); "Brit. Mus. Cat.", p. 97.

**Lumulites**, Lamouroux (pars); Defrance (pars); Deslongchamps (pars); Goldfuss (pars); De Blainville (pars); Gray; Cuvier and Bronnuiart; Lonsdale (pars); Michelin (pars).

**Fenditima** (pars), Lonsdale.

Five species (recent); numerous fossil.

Gen. 2. **Lumulites**, Lamouroux.

Cells arranged in series radiating from the centre and bifurcating as they advance; vibracula in linear series alternate with those of the cells.

Four species (recent); numerous fossil.

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17, **Eschara foliacea**. 18, *via Lowel*. 19, **Fenditima ovata**.

Gen. 3. **Selamiaceae**, Busk.

Only a certain number of cells, dispersed at uniform dis-
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Pol.

A. Erecta.
Polyzoa erect, free, simple or branched, linear or expanded above; branches articulatd or continuous.

Polyzoa divided into distinct internodes, connected by a horny substance.

A single cell in each internode.
Sertularia (pars), Linn.; Berkeley (pars); Esper (pars); Cellularia (pars), Pallas; Hogg.
Cellaria, Ellis and Solander (pars); Lamarck (pars).
Esperia, Lamouroux (pars); Riso (pars); Fleming (pars); Templeton.
Uncellaria (pars), Blainville.
Creisia, Milne-Edwards.
Criosa (pars), Johnston; Hassall (pars), &c.
One or two species.

Gen. 2. Crisia, Lamouroux. (Fig. 20.)
Two or more cells in each internode.
Syn. as above.
Three species recent; several fossil.

Family 2. Idmonaeidae.
Polyzoa continuous throughout, usually polymorphous.

Gen. 1. Idmona, Lamouroux. (Fig. 22.)
Openings of cells disposed in transverse or oblique alternate series on each side of the front of the branches of the polyzoa, on which is a raised line or ridge separating the rows of cells.
Idmona (ep.), Lamarck.
Hornera (ep.), Defrance.
Idmona, Lamouroux; Blainville.

Gen. 2. Pustulipora, De Blainville. (Fig. 26.)
Openings of cells disposed irregularly, on all sides of the cylindrical or compressed branches or lobes of the polyzoa.
Ceriopora (pars), Goldfuss.
Idmona (ep.), De Blainville.
Pustulipora, Blainville; Milne-Edwards; Johnston.
Pustulipora (sp.), Couche.
Five or six species recent; many fossil.

Gen. 3. Hornera, Lamouroux.
Openings of cells disposed irregularly, or in more or less regular opposite transverse series, on one side only of the branches or lobes of the polyzoa.
Millepora (ep.), Esper.
Pustulipora (ep.), Lamarck.
Hornera, Lamouroux; De Blainville; Milne-Edwards.
Several species recent; many fossil.

B. Adnates, decumbentes.
Polyzoa adnate or suberect above, decumbent and adnate below.

Family 3. Tubuliporae.
Polyzoa divided into linear or sublinear branches or lobes, sometimes more expanded and lobate upwards, always decumbent, and closely adnate.

Gen. 1. Actico, Lamouroux. (Fig. 21.)
Polyzoa composed of a single or of multiple series of cells.
Actico, Lamouroux; Milne-Edwards; Johnston (pars);
De Blainville; Fleming.
Millepora (ep.), Linn.
Ausopora (ep.), Goldfuss, &c.
Three or four species recent; several fossil.

Gen. 2. Tubulipora. (Fig. 23.)
Polyzoa 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; Turton; Cuvier; Gmelin; Cuvier (pars); Fleming (pars); Lamarck (pars); Riso (pars).
Tubulipora (ep.), Linn.; Jameson; Stewart; Bone.
Millepora (ep.), Ellis and Solander.
Collepora (ep.), Esper.
Pheresia (l), Lamouroux, &c.
Five or six species recent; several fossil.

Family 4. Discoporaeae.
Polyzoa in the form of a closely adnate, circular, or irregular disc or patch.

Gen. 1. Discopora, Lamarck.
Polyzoa 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 calccreous border.
Discopora, Lamarck; Lamouroux; Fleming.
Tubulipora (pars), Johnston.
Maloealia, Audouin.
Obelia, Quoy and Gaimard.
Madrepore, Ellis and Solander; O. Fabricius.

Gen. 2. Diastopora, Lamouroux. (Fig. 24.)
Polyzoa more or less depressed, circular, discoid; the cells subalternating, horizontal, immersed; openings elliptical.
Polyzoa either discolb and adnate throughout, or fungiform and attached by a short stem; openings of tubes disposed in lines or rows radiating from the centre.

*Peloria*, Lamouroux.

*Liopora*, Michelin.

*Tabulipora*, Milne-Edwards (sp.) ; Johnston (sp.).

*Ceripora* (anet., paro).

*Defrancia*, Brunn.; Hagenow; Reuss.

Sub-Order III. *Clenostomatata*.

Cells corneous, or fleshy, tubular or depressed, free or coalescent; mouth terminal or subterminal, contractile, and when the polypode is exserted, surrounded with a fringe or row of setae, connected by a delicate membrane.

*Vestula*, Johnston.

*Polyoa cornosa*, Gray, and including—

*Halocyonella*, Johnston.

*Polyoa cornosa*, Gray.

*Alcogoniadus* and *Alcyonidula*, Johnston.


Cells tubular or ovate, separate, arising from a basal tube common to all or to several; mouth terminal.

*Vestulaeridae*, Johnston.

Gen. 1. *Serriaria*, Lamarck. (Fig. 25.)

Cells uniserial or biserial, and uniserial, placed in close sets at staked intervals; basal tube divided into internodes.
Freshwater Polygon, Allman.
Freshwater Bryoos, Hancock.
Bryozoaires Flavislites, Van Beneden.

Family 1. Crisataellidae, 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. Plumatellidae, Allman.
Polyzoary rooted.

A. Lophophore with two long arms.

Gen. 1. Lophophus, Dumortier.
Polyzoary saciform, hyaline, with a disc which serves for attachment, but not for locomotion; orifices scattered; ectocyst gelatinous.
Polyta Chama Apanche, Trembley.
Bell-Flower-Animal, Baker.

Gen. 2. Alecyonella, Lamark.
Polyzoary tubular; tubes united by their sides; orifices terminal; ectocyst pergametaceous.

Tubularia, Pallas.
Leucopha, Muller.

Gen. 3. Plumatella, Lamark. (Fig. 30.)
Polyzoary tubular; tubes distinct; ectocyst parchmentaceous.

Tubipora, Linnens.

Tubularia, Muller; Linnens; Vaucher; Turton.

Nastis, Lamozeaux; Deslongchamps.

Plumatella, De Blainville; Carus; Lamark; Dumontier; Johnston; Gervais; Allman; Thompson; Van Beneden; Dalzell; Schweighe; Risso; &c.

Three species.

Ten species.

Polzoary conserved, composed of a membran-corneous branched tube, with the branches distinct and terminated by the orifices; lophophore nearly circular, tentacular crown campuseulate; ova bean-shaped, destitute of annulus or spines.

Tubularia, Blumenbach; Gmelin.
Nastis, Lamozeaux.
Diffla, Maillet.
Plumatella, Fleming; Dumontier; Johnston.
Fredericella, Gervais; Van Beneden; Thompson; Allman; Johnston; Hancock.

Family 3. Pothecidae.
Lophophore orbicular, mouth destitute of valve. (Does not perhaps properly belong to P. hippocrepia.)

Gen. 1. Pothecia, Gervais.
Polyzoary membran-corneous, 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 wider extremity of each cell; ova lenticular, with a narrow annulus.

Aleyonella (sp.), Ehrenberg; Nordmann.

Pothecia, Gervais; Van Beneden; Allman; Thompson; Johnston; Hancock.

POLYCHITON, a genus of Plants belonging to the natural order of Fities, the sub-order Polyzoaceae, and the tribe Aspidiceae. The indusium is circular, attached by the centre; the veins are distinct after leaving the midrib. There are three British species -

P. Lachmata, with rigid simply pinnate fronds. Found in Alpine rocks.

P. acutilam, with linear rigid bipinnate fronds; the pinnules obliquely decurrent. Common in hedge banks.

P. angulata, with the fronds lax, drooping, bipinnate, pinnules 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.)

POMPILED, a family of Fossorial Hymenopterous Insects. They are sometimes included with the Sphegidae. 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 Pepsis are amongst the largest of the Hymenoptera. The genus Pompilius 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 sputtered. Their long legs give them the appearance of spiders. (Westwood, Families of Insects.)

PONERA (Latrelle), a genus of Insects belonging to the family Formicidae. In this genus the females and females are armed with a sting. The peduncle of the abdomen is formed of a single knot; 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, &c.]

POOR LAWS. There have been several statutes making slight alterations and amendments in the details of the administration of the Poor Law, 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 Pauflreis ['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 597 to 624, including 14,165 parishes in England and Wales, and leaving only 436 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 price of corn. As the subsequent returns only confirm the same fact, we shall omit the price of wheat,
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 the third year, the amount expended for the maintenance and relief of the poor.

<table>
<thead>
<tr>
<th>Years</th>
<th>£</th>
<th>£</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840</td>
<td>6,014,605</td>
<td>4,576,965</td>
<td>1,780,035</td>
</tr>
<tr>
<td>1841</td>
<td>6,851,828</td>
<td>4,760,929</td>
<td>1,396,875</td>
</tr>
<tr>
<td>1842</td>
<td>6,555,859</td>
<td>4,911,489</td>
<td>1,719,276</td>
</tr>
<tr>
<td>1843</td>
<td>7,086,355</td>
<td>5,322,075</td>
<td>1,702,800</td>
</tr>
<tr>
<td>1844</td>
<td>7,375,676</td>
<td>5,157,824</td>
<td>1,677,852</td>
</tr>
<tr>
<td>1845</td>
<td>6,791,066</td>
<td>5,039,703</td>
<td>1,961,652</td>
</tr>
<tr>
<td>1846</td>
<td>6,806,623</td>
<td>4,854,204</td>
<td>1,824,717</td>
</tr>
<tr>
<td>1847</td>
<td>6,871,450</td>
<td>4,180,757</td>
<td>1,590,900</td>
</tr>
<tr>
<td>1848</td>
<td>7,187,410</td>
<td>4,180,757</td>
<td>1,090,900</td>
</tr>
</tbody>
</table>

In the years above mentioned we may observe that in 1852 the average price of wheat was 39s. 4d.; in 1840 it was 68s. 6d.; yet the amount of relief shows 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, 13,529 persons out of 20,055 in workhouses were 1,230,927 had out-door relief. The relief continued to increase till 1843, when the number in the house was 238,660, and receiving out-door relief 1,300,920. The numbers then slowly decreased till 1847, when the In-door relief was 7,086,355, and receiving out-door relief amounted to 1,961,652. The estimated total for the year, however, including 214,670 for places not included in the returns, was 1,043,866. In 1853 the number similarly calculated had sunk to 975,030. 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 843,430, being a decrease from 1856, in the same number of unions, of 33,325, or 3.8 per cent. Of adult able-bodied paupers relieved, exclusive of vagrants, there were 50,572, or 6.2 per cent. of the able-bodied population, of which number relieved, 50,269 were widows, a decrease in the same class of 2291. Of the gross number of able-bodied paupers, 32,365 were in the receipt of in-door relief, a decrease of 1186 only, so that the chief decrease is in out-door relief. The greatest decreases took place at Bedford, Lancaster, Nottingham, Rutland, and Caernarvon, where it exceeded 20 per cent. In Kent, Hereford, Durham, Oxford, Sussex, and Worcester, there was an increase, as also in several of the Welsh counties. Of the in-door able-bodied, there were 842 married men, 1007 married women, 5921 other males, and 14,677 other females. Of the out-door able-bodied, 23 males had been relieved in cases of sudden or urgent necessity; 17,210 males in cases of their own sickness or accident, 6856 males in cases of sickness or accident in their family, or for a funeral; 3784 males for want of work or other causes; 22,830 females were wives of adult males, 50,383 were widows, 5114 were single women without children, 2090 the mothers of illegitimate children; 2018 were wives relieved on account of the husband being in jail, &c.; 1268 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 good and bad harvests in previous years, 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 Cornewall Lewis, was passed. The Act 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 in 1840, and the first returns of the third year showed that the expense amounted to 5,359,022. The amount was so great, that loans to a large 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 Limerick. On Jan. 1, 1841, there were 25,900 in workhouses, of whom 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 31,105 destitute persons, and 15,246 were then in receipt of relief. The total expenditure had been 177,771l. On Dec. 31, 1842, there were 31,073 inmates in 92 union workhouses, 87,604 persons had been relieved, and the expense had been 281,233l. On Dec. 31, 1843, there were 33,510 inmates in 106 workhouses, 298,595 persons had been relieved, and the expenditure had been 343,274l. On Dec. 31, 1844, there were 39,175 inmates in 115 workhouses, 105,395 persons had been relieved, and the expense had been 399,530l. 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 42,068 inmates in 123 workhouses (in March 1845 there had been 50,717), 114,205 persons had been relieved, and the expenditure amounted to 516,024l. In 1846 the potato-rot continued, and the government was forced to intervene for 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 office Mr. Canning took a prominent part. The total relief amounted to 98,004l., the whole sum contributed amounting to 631,372l. 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, 245,929 persons had been relieved, and the expenditure had amounted to 430,625l. 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, and the government was compelled to suspend them. The fisheries were deserted, and even artisans left their trades. In October 1846 there were 114,000 men employed; in January 1847 the number had increased to 670,000; 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 620,000, in May to 419,000, in June to 101,000, on the 26th of which month it was reduced to 29,000, and in August only 10,000. In 1847 a new government was in power, and 18,000,000l. had been supplied, and in July 1847, 3,020,712 persons received separate rations. The entire amount advanced by government in 1846 and 1847 had been 7,132,395l., and the amount subscribed had been upwards of half a million. It was in 1848 that the change of system was successfully completed.
had gradually been instituted, and in Sept. 1833 the total number of boys in the workhouses of Ireland, between the ages of 9 and 15, was 12,520; of girls, between the same ages, 14,573; of these, 8,973 boys were employed in agricultural labour, and so many girls; the number of acres, of which 1,070 were under crop, wholly or partially cultivated by boys; and 3,196 were receiving instruction in trade. Of the girls, 9,166 were receiving industrial education of various sorts. Of these, 2,032, or 21.5 per cent, had been in the workhouse for fifteen, or had obtained employment, during the year 1832, out of the workhouse. On Sept. 29, 1834, the total number of persons receiving in-door relief during the year had been 315,380, out-door 7954, the total expenditure being 74,607L. On the 1st of November 1834, there were 12,888 rates-payers receiving relief; during the year the total expenditure had been 269,900, out of the house 33,342L, total expenditure 683,596L. On the first Saturday of January, 1837, in the 163 unions of Ireland, there were 58,183 persons receiving in-door relief, and 511 out-door relief, showing a total decrease of 16,900 persons—23.3 per cent.—from the Return of the same date in 1836. Less than a third of the workhouse accommodation was in use, provision having been made for 199,667, which is itself a reduction of the provision for previous years. The poor-rate collected in the year ending September 29, 1836, amounted to 723,797L, of which 76,160L. were expended for Poor Law purposes, being a decrease on the preceding year of 109,098L. For medical charities 88,990L. were paid, and 434L. on account of annuities. In the year 1836 the amount of out-relief paid throughout Ireland was 44L.; in the year ending Sept. 29, 1836, it was 2198L., while emigration expenses amounted to 417L. It has been shown that there has been no effective legal provision for the poor. As early as 1570 power was given to magis-
trates in burgesses and justices in the country, a power afterwards transferred to the heritors and kirk sessions of parishes, to assess the parish for the support of the poor; but no assess-
ment was made under this authority after its passing, and when it became necessary in some few parishes it was confined to them alone. Other acts were passed for pre-
venting begging, for providing houses of correction for vagrants, for compelling each parish to maintain and provide for the able-bodied. But, as a general practice, the wants of the infirm, sick, and impotent poor were relieved by the voluntary contributions received at the kirk, and distributed by the kirk sessions, usually in the form of assistance to the relatives or connections of the de-
situte persons who undertook their support. This system did not work badly in country districts, except in periods of extreme and general distress. But when, by the extension of manufactures and commerce, the population increased in large towns, and the influx of strangers took place to them, the necessity of a more perfect system was very shortly felt. This had been experienced in Glasgow, Paisley, and Dundee on various occasions, but temporary expedients and increased voluntary efforts had been used to maintain a tolerable state, until 1841, and 1842, however, the distress in Paisley could not be thus relieved, although it had been in less severe trials in 1819, 1827, and 1837. At the census of 1841 the population of Paisley amounted to 46,418; in January, 1842, the number of persons d-pending on the relief fund was 12,709, and in the following June it was still 10,417. The inhabi-
tants at a public meeting, agreed to a voluntary assessment of 15 per cent. on their parochial rates, and this produced 874L. 7s. 6d. which was placed in the rates-payers' suffering. Relief aid was sought, and subscriptions to the amount of 25,000L. were obtained, a trifling alleviation of a suffering that the relief committee described as frightful. The law and the practice had always been in Scotland to refuse relief to able-
bodied adults, consequently the unfortunate artisans, deprived of his employment by the commercial difficulties occurring between 1838 and 1843, was not considered as belonging to the class receiving relief from the kirk sessions. The number of kirk sessions which in 1834 had no rates-payers amounted to 700, and the expenditure on them had been 3698L., neither the number nor the amount varying much from the usual average.

In 1849 a government commission was appointed to in-
quire into the condition of the poor in Scotland and the mode of managing the poor in Scotland. They reported that the parishes in most large towns had been forced to resort to assessment, but that it was generally disliked, and that the modes of assess-
ment were so various in different places that it was difficult to make one that should be strictly just. Here and there 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. 55 was passed. It created several boards of manage-
ment elected by the rate-payers, a board of supervision; gave the power of levying assessments; the option of com-
bining parishes for the erection of poor-houses; made a more flexible legislation regarding the state of the parish, the condition, and unsettled poor, for medical relief, and for retirement and assessment; but it still leaves the able-bodied 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 raised by contribution 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 out of 380 parishes in Scotland, only 289 had actually assessed in 1842-43; these have been gradually increased, so that now (1838) 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 forms. 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 Febru-
ary 1, 1846, was 1,475,418L. From this it appeared that from all sources there was raised for the relief of the poor in 1836 the sum of 171,042L. and 218,461L. in 1841; the amount having gradually increased in every succeeding year, and the circumstances that in 1841 were not stated, but on February 1, 1846, there were 63,070 on the poor roll. In the year ending February 1, 1846, there had been raised 306,044L., of which 295,239L. were expended in poor relief. In the autumn of 1846 the potato rot visited Scotland, and again in 1847, it continued to spread over a vast amount of dis-
tract, 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 the relief of medical care. For the few following years there is no progress in the case as stated.

<table>
<thead>
<tr>
<th>Registered poor</th>
<th>Casual poor</th>
<th>Medical relief</th>
<th>Poor-houses</th>
<th>Other expenditure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1847</td>
<td>335,115</td>
<td>35,340</td>
<td>12,979</td>
<td>48,181</td>
<td>433,915</td>
</tr>
<tr>
<td>1848</td>
<td>408,866</td>
<td>53,384</td>
<td>30,240</td>
<td>10,971</td>
<td>74,753</td>
</tr>
<tr>
<td>1849</td>
<td>417,460</td>
<td>54,564</td>
<td>33,246</td>
<td>12,204</td>
<td>77,544</td>
</tr>
<tr>
<td>1850</td>
<td>419,219</td>
<td>51,918</td>
<td>26,472</td>
<td>21,419</td>
<td>68,930</td>
</tr>
<tr>
<td>1851</td>
<td>404,219</td>
<td>53,918</td>
<td>21,311</td>
<td>21,376</td>
<td>65,920</td>
</tr>
<tr>
<td>1852</td>
<td>415,854</td>
<td>53,907</td>
<td>21,438</td>
<td>21,186</td>
<td>65,305</td>
</tr>
<tr>
<td>1853</td>
<td>413,185</td>
<td>54,114</td>
<td>21,783</td>
<td>21,921</td>
<td>65,492</td>
</tr>
</tbody>
</table>

During these years the highest number of the poor on the register was 82,337 in 1849, the lowest 69,433 in 1846; the greatest number of casual poor relieved was 126,054 in 1848, the lowest 56,033 in 1832. The number of houses were frequently large more than 3500; and the number of orphans or deserted children have increased from 4794 in 1847 to 5328 in 1853. The figures for the following years vary little in their details, showing chiefly an increase as the system extends, and as the returns are published. In the year ending May 14, 1857, the total amount expended in poor-law relief was 639,484L., including 27,577L. on buildings, on medical relief 61,553L., on law charges 27,277L., and on management 7290L. The number of registered poor who received relief in the year ending May 14, 1857, was 88,092, 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 150 parishes, in which there were 15,043 inmates, and 16 others were in course of erection. The number of registered poor on the 14th of May, 1857, was 60,217. (History of the Poor Laws. By Sir George Nicholls.)

**POINJAY** (Pica viridis). [Woodpigeon.]

**POPULIN.** [Chemistry, S. 1.]

**POPLUS.** [Salix nigra.]

**PORLOCK.** [Somersetshire.]

**PORPHYROXINE.** [Chemistry, S. 2.]

**PORPIONE.** [Chemistry, S. 2.]

3 Y
PORPOISE, or PORPESSE. [WHALES].
PORIT HOPE. [CANADA, &c.]
PORT LINCOLN. [SOUTH AUSTRALIA, &c.]
PORT MELBOURNE. [SOUTH AUSTRALIA, &c.]
PORT PHILLIP. [VICTORIA, &c.]

PORTER, ANNA MARIA, born at Durham about 1751, was the youngest child of a family all of whom attained considerable eminence. Her eldest brother, Robert, was an English Architect at Bristol; another brother was Sir R. K. Porter; and 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, resolved to send Edith, the eldest daughter, to school. She was a precocious; and as a lively 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 early attempts in the same line. While still almost a child she became intimate with the Watts family. She was married twice; first to a merchant in London, who died 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 Janet, they settled first at Thames Ditton, and finally at Esher. After the death of her mother in 1831, 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, Montpelier, near Bristol. Before her death, it is said, she had published numerous novels, among which 'The Hungarian Brothers,' 'Don Sebastian,' 'The Recluse of Norway,' 'The Village of Mariendorf,' 'The Fast of St. Magdalen,' and 'The Knight of St. Johns,' enjoyed and retained considerable popularity. Her works were, on the whole, neither original nor fresh, nor do they contain any of the highest qualities of the art. She was a good story-teller, and skilful in the management of the story, and some discrimination of character; but her heroes and heroines too often possess a superhuman excellence that becomes palatable. 'The Tales of Pity,' were 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.

PORTER, Sir Richard, one of the elder set of brothers, was born in 1776. Her life followed that of her sister, with whom and her mother she constantly resided till their deaths. She then, 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, 1860. Miss Jane Porter did not adventure into the field of literature till after the death of her brother, and in some respects the works were 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 finer delineation, and perhaps somewhat greater knowledge, though not very rigidly adhered to in捃 the lower classes. 'The Thai trencher.' Her first work was 'Thadeiess of Warsaw,' published in 1803, which was extremely popular, and procured for her the admission as a canoness into the Teutonic order of St. Josehin, and a complimentary letter from Koecisouko. 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 little less than demi-gods. To these followed the 'Pastor's Fireside' and 'Duke Christian of Luneburgh,' the latter said to have been suggested by George the Fourth. She next joined with her sister in 'Tales round a Winter's Hearth,' and those were followed 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 dramatised. After a considerable interval, during which she contributed largely to periodical works, among others being a biography of Colonel Denman, the 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 characters of the better writers and history of the period, that it was for a considerable time doubted 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 Taylor's school, where he was intimately acquainted 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 of commercial knowledge, and of some use for literary objects. In 1830 he published a work, 'On the 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, Progress, and Projection of the Bank of England System of Paper Money and Bank Credit,' was issued in a volume of Lardner's 'Cabinet Cyclopaedia,' for which series, in 1842, he wrote a similar treatise 'On the Manufacture of Porcelain and Glass.' His paper in the 'Companion to the Almanac,' of which Mr. Charles Knight was the editor, were afterwards published in his official appointment in the Board of Trade. In an article in the 'Gentleman's Magazine,' for October 1825, the circumstance is thus correctly stated:—"Mr. Knight was written to by the late Lord Auckland, and was requested that he would wait on that minister at his office at his earliest convenience, and was asked at the interview whether he would undertake the task of arranging and digesting for the board the mass of information contained in blue books and parliamentary returns; in short, if he would do for the Board of Trade what Mr. Porter has since done so well, and what Mr. Fonblanque continues to do for the same office, with the same accuracy and success. Mr. Knight hesitated. The engagement, however, was accepted, and Mr. Porter made a tolerable measure with his business as a publisher. In this dilemma, he consulted a distinguished friend, and by that friend was advised to wait on Lord Auckland, and decline the office. This he did; and at Lord Auckland's request, he named Mr. Fosh, who had been appointed to that position." The first appointment of Mr. Porter at the Board of Trade took place in 1832. It was an experimental appointment at a small salary. When the statistical department of the Board of Trade was fully organised, Mr. Porter was placed at its head. In 1840 he was appointed in addition, senior member of the railway department of the board, then newly constituted to meet the growing increase of projects in that direction. His able reports, which were laid before Parliament in the last quarter of the same year, were appreciated by official men and by the public. For his labours in this department he had an additional salary of 200l. a-year. On the retirement of Mr. McGregor, as one of the secretaries of the Board of Trade, in 1841, Mr. Porter was appointed to succeed him, at the salary of 1500l. a-year. His labours in all these positions were increasing and successful. He had a genius for tabulating the most incongruous materials, and he formed the model, which he afterwards carried out, of a system of accounts, as the data was collected, and which has actually been issued from the Board of Trade with so much advantage to the commerce of the country. But his active mind was not confined to his official duties. In 1833 he published 'The Tropical Agriculturist.' In 1834 he exerted himself for the cause of the convicts in Australia, and then for a considerable time one of the vice-presidents, and on the resignation of Mr. Hallam in 1841, he was chosen treasurer. To the 'Journal' of the Society he was a frequent contributor. In 1836 he published 'The Progress of the Nation, in its social and commercial relations, from the beginning of the Nineteenth Century to the Present Time. Sections I. and II., Population and Production." Sections III. and IV., "Interchange, and Revenue and Expenditure," followed in 1838; and the work was completed in 3 vols. 12mo, by Sections V. to VIII., including 'Consumption, Accumulation, Moral Progress, Colonial and Foreign Dependants.' This valuable work necessarily admits of constant corrections. "The New Tables of "The New Tables of Trade, and other observances of the country," issued in a large 8vo volume, in 1847 and 1851. The most important information clearly set forth in this work presents the best and most complete picture of the progress and state of the country for the period of which it treats. On the establishment of the British Association for the Advancement of Science, he became one of its most active members, always attended its annual meetings, and usually read a paper to the statistical section. Mr. Porter had been ever a firm and unswerving advocate of the doctrines of free-trade, and in 1849 he published a pamphlet entitled "Free Trade for All," and "Popular Fallacies regarding General Interests," in 16mo. In the same year he wrote the Fifteenth Section of the 'Admiralty Manual of Scientific Inquiry,' edited by Sir J. F. Herschel, which was subsequently published alone in 1851. In 1850, in conjunction with Mr. George Long, he

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wrote the 'Geography of Great Britain. Part I. England and Wales,' published at York for the Diffusion of Useful Knowledge. This was his last unofficial labour. Sedentary pursuits had induced a bad habit of body, and the sting of a gnaw produced inflammation of the leg, from the consequences of which he died on September 3, 1855, at Tombridge Wells, whether he had gone in hopes of relief.

PORTSEA. [PORTSMOUTH.]

PORTUGAL. The political divisions of the Kingdom of Portugal, with the area and population of each, are as follows:

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Districts</th>
<th>Area in Square Miles</th>
<th>Population in 1881.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alentejo</td>
<td>Portalegre</td>
<td>2,822</td>
<td>86,175</td>
</tr>
<tr>
<td></td>
<td>Evora</td>
<td>2,669</td>
<td>88,617</td>
</tr>
<tr>
<td></td>
<td>Beja</td>
<td>3,991</td>
<td>125,107</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,926</td>
<td>397,899</td>
</tr>
<tr>
<td>Algarve</td>
<td>Faro</td>
<td>2,140</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></td>
<td>Baixa</td>
<td>2,128</td>
<td>206,736</td>
</tr>
<tr>
<td></td>
<td>Guarda, Bracor</td>
<td>2,474</td>
<td>139,048</td>
</tr>
<tr>
<td></td>
<td>Brejo, Bragos</td>
<td>1,067</td>
<td>359,583</td>
</tr>
<tr>
<td>Douro</td>
<td>Aveiro</td>
<td>1,458</td>
<td>247,103</td>
</tr>
<tr>
<td></td>
<td>Coimbra</td>
<td>1,337</td>
<td>261,536</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,765</td>
<td>1,926,390</td>
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<tr>
<td>Entre Douro e Minho</td>
<td>Viana</td>
<td>954</td>
<td>184,359</td>
</tr>
<tr>
<td></td>
<td>Viseu</td>
<td>1,056</td>
<td>297,969</td>
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<tr>
<td></td>
<td></td>
<td>2,040</td>
<td>482,328</td>
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<tr>
<td>Estremadura</td>
<td>Leiria</td>
<td>1,312</td>
<td>140,114</td>
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<tr>
<td></td>
<td>Santarem</td>
<td>2,315</td>
<td>161,342</td>
</tr>
<tr>
<td></td>
<td>Lisbon</td>
<td>3,615</td>
<td>425,705</td>
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<td></td>
<td>7,242</td>
<td>725,161</td>
</tr>
<tr>
<td>Tras os Montes</td>
<td>Bragança</td>
<td>2,374</td>
<td>296,617</td>
</tr>
<tr>
<td></td>
<td>Villa Real</td>
<td>1,646</td>
<td>184,779</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,020</td>
<td>311,356</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>35,189</td>
<td>3,487,025</td>
</tr>
</tbody>
</table>

In addition to the above political divisions, each of the sub-provinces or districts is subdivided into comarcas (or judicial divisions), cancellos (or communal divisions), and parishes. The total number of comarcas is 111; of cancellos, 379; and of parishes, 3774.

PORTUMNA. Galway, Ireland, a market-town and the seat of a Poor-Law Union, is situated at the head of Lough Derg, in 53° 6' N. lat., 8° 12' W. long., 41 miles S.E. from Galway, and 94 miles W.S.W. from Dublin. The population in 1861 was 1,542, besides 147 in the Union workhouse. Portumna Poor-Law Union comprises 16 electoral divisions, with an area of 77,046 acres, and a population in 1861 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 600 feet in length. Quarter and petty sessions are held in the town. Saturday is the market-day; fairs are held six times a year. Portumna Castle, a fine baronial mansion, the seat of the Marquis of Cianricarde, was destroyed by fire in 1856.

POST OFFICE. In the 'Penny Cyclopedia,' vol. xviii. 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 franks, public statutes, and newspapers (of which there were 44,500,000), was 136,423,836. In 1839 the new system was introduced, but 1840 was the first entire year of the penny postage, but then letters might be paid, or stamped, or were charged double. In that year 82,000,000 letters were passed through the post-offices of the United Kingdom. The revenue derived from the post-office had been 1,649,088l. in 1839; in 1840 it only amounted to 495,614l. In 1845 the number of letters had reached 250,161,611, and the revenue 708,670,089l.; the number of letters and the amount of 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 an uniform rate of 6d. per pound. This privilege was gradually extended to the British Colonies. In 1855 the rate of post-office printed sheets was reduced to one penny for a quarter of a pound, twopenny for half a pound, and twopence extra for each fraction above half a pound; but if fourpence or upwards were written on the packet more than 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, and the Gambia Colony, all of which they are all charged 6d. per pound more, 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 in 1857 reduced to an uniform rate of 6d. per half ounce, payable in advance.

The fourth annual return of the Post-Office for 1857 states that the total number of letters delivered in the year was 504,491,000, of which 303,600,000 were in England and Wales, 42,306,000 in Ireland, and 51,618,000 in Scotland. 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 880,000 newspapers, and 1,700,000 letters that from various causes could not be delivered, chiefly from illegible direction, or erroneous address. The gross revenue was 2,928,858l.; the cost of management 1,720,814l.; the net revenue 1,208,374l.

The cost of management includes the following items:—Salaries, pensions, &c., 1,119,485l. Postage-stamps, 110,301l. Post-office uses of railways, 490,000l.; by coaches, carts, &c., & wages of mail-guards, 165,000l.; by mail-packets (when paid for by the Post-Office) and private ships, 12,000l.; for manufacture of postage-stamps, 26,000l.; miscellaneous, including conveyance of mails in the Colonies, under the postal direction 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, or 124,862 for every 100 persons of the population; over 1856. Of the total number 5,417,303 orders, to the amount of 10,410,863l., were issued in England; 459,632, to the amount of 818,337l., in Ireland; and 512,574, to the amount of 590,572l., in Scotland. The commission gave a profit, after interest, in England, of 38,012l., and in Scotland of 1180l.; in Ireland there was a loss of 618l. 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 Gibraltar.

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 post-office, if necessary, or sent by the宫廷 post-office and expedited the morning delivery in London by nearly 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 different post-office were returned. The mails then were conveyed in 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-East, South-East, South West, and South 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 divisions.

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 62 such towns added to the list; for instance, in 1858 Manchester has four communications daily with London, Birmingham, Oldham, Bradford, Ashton-under-Lyne, Halifax, Sheffield, Wakefield, and Chesterham; seven with Liverpool; and five with Leeds, Stockport, Rochdale, and Bolton; twenty-nine mails are despatched from, and the same number received at, the Manchester post-office every day. In 1856 the mails within the United Kingdom were conveyed daily over 192,480 miles of way; of this, 30,172 miles are by railway at an average rate of 5d. a mile; 20,997 by coaches, mail-cars, &c., at an average rate of 6d. a mile; 63,438 by carriers foot, at an average rate of 1d. a mile; and 28,796 by packets and boats between different places in the United Kingdom, at rates varying from 5a. 6d. a mile to 4d. a mile.

The total number of persons engaged in the service of the Post-office in the United Kingdom was 22,731 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 offices, &c.; 11,101 postmasters; 1610 clerks (exclusive of some employed temporarily); 204 guards; 10,427 letter-carriers, messengers, &c.; 8 marine officers; 126 postmasters, clerks, &c., in the Colonies; and 51 agents in foreign countries. Of these, 15,163 are employed at the post-office (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 parts of the kingdom were only transported on a single day. 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 official mail service was 105,084l., including salaries of mail-postmasters and the conveyance of mails. Out of this, 56,600l. only was allotted to the provinces; the sum now (1856) allotted for the like service is 134,000l., divided thus: conveyance of mails by railways, 65,000l.; by coaches and cars, 27,166l.; by foot-messengers, 10,334l.; and salaries and wages paid in provincial offices, 31,122l. In 1859 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 1859 the average was 4d. a mile for England 2d., for Scotland 3d., and for Ireland 2d.

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 Clonmel and Killamoil, and made his own bargain with the postmaster, as he did for the rest of the kingdom. He then sent the postmaster usually retained one moiety of the sum allowed, as his own purquisite, and Mr. Bianconi performed the work for the remainder. What Mr. Bianconi received was thus very small; but, in 1830, he found that the improvements he had made, and which were not incurred to his passenger traffic, or faster than 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 1,400 horses, and daily conveyed 3,800 miles. The opening of the canals and railways rendered the services of horse 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 they might be required. At a moment's notice 1,000 horses, working in the metropolis of London, were moved to the town of Wexford in the south-east, to the mountains of Donegal 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 naturalized, and England, as well as Ireland, should be ready to acknowledge his merits; it must be said 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 passes nearly one-half of the total correspondence of the kingdom, attains a great predominance, the amount in 1857 being 509,283l.; the next was Edinburgh, with 104,665l.; while Manchester, with 316,100 inhabitants, only contributes 89,762l.; and Birmingham, with 232,000 inhabitants, but 42,107l. Bristol, with about 100,000 inhabitants (including Bedminster), furnished 26,004l. Leeds with 272,279 inhabitants, only 18,550l.; and Sheffield, with 135,000 inhabitants, no more than 16,365l. In Ireland the contributions are more in accordance with the size of the towns:—Dublin contributes 60,391l.; Belfast, 15,547l.; Cork, 11,915l.; and Limerick, 8,977l. In the small town of Edin-burgh, with 160,000 inhabitants, contributes 59,177l.; and Glasgow, with 358,000 inhabitants, only 68,877l. 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 different points in the kingdom.

**POTATO. SWEET. [Battan.]**

**PUTTINGE, 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 Edward Curwen Pottinge, Esq., of Mount Pottinge, county Down, by Anne, daughter of Robert Gordon, Esq., of Florida Manor, in the same county. He went to India as a cadet in 1804. At an early age he attracted the attention of the civil and military capacity, as well as his ready store of information bearing on his profession. Rising by gradual steps, he became successive judge and collector at Ahmednagar in the Deccan, and (the office of the additional collector-general) in the former capacity of the office of the finance of the revenue of the province of Scinde. For his services in these capacities he was raised to a baronetcy, when General Keane 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 superintendant of the British trade in that country; and in this two-fold capacity he took very decisive measures. Having returned to England in 1844, he was appointed high commissioner in the government of New South Wales, and was a member of the council of the colony. Having officiated, he proceeded to concert his measures with Admiral 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 afford a guarantee against the necessity of the repetition of offensive measures. For these services Sir Henry Pottinge was made a Knight Grand Cross of the Order of the Bath, and governor and lord of the British resident of the island of Peeping Kong. Having returned to England in 1844, he was sworn a member of the Privy Council, and a pension of 1500l. a year was settled on him by a vote of the House of Commons. In 1840 he was born at Bath, and was raised to the dignity of a baronet in 1839. In 1846 he was placed in the post of governor of the Madras Settlements, the chief seat of the British East India Company, and was placed under the command of Lord Maitland in the governorship of the island of the Good Hope; this office he 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 1846, having previously been raised to the local rank of lieutenant-
general in India. He died at Malta, on the 18th of March 1856, leaving behind him the reputation of an able and upright administrator, and an officer who had rendered great services to his country.

POTTON. [Bedfordshire.]

PRADEII, JAMES, was born at Geneva in May 1792. While quite young he went to Paris, and placed in the studio of the sculptor Lenoir. His first public success was gained in 1815, when, through a technical informality, his model being pronounced unqualified to compete for the first prize of the Academy, an extra gold medal was awarded him. Chiefly from the public encouragement he obtained for his group of Philoctetes the first prize, and with it the privilege of proceeding as Academy student to Rome. In that city he remained five years, and produced during that time several original works. Although he is said to have been addicted to Parisian fashion, and to have often style upon it, there can be little doubt that the influence of Canova was much more powerful, and that the softness, finish, and elegance, for which that eminent sculptor was so celebrated, were what Potton most anxiously endeavoured to realize; but whilst in these qualities he at the least rivalled Canova, he went far beyond him in that tendency to the sensuous and the voluptuous which was no less decidedly characteristic of the great Italian. The countrymen of Pradier were sufficiently accounted for, and many of them, no doubt, with a certain air of superiority. So "delicatamente voluptuosissime;" but to a colder English critic the delicacy often seems wanting, and while he cannot but admire the exquisite modelling of the form, he is constrained to turn with regret from what seems the perverse manner in which it is conceived.

From his return to France in 1819 down to his death, M. Pradier enjoyed a career of unbroken Parisian popularity; and during his later years, while all admitted him to be one of the most accomplished, by many he was regarded as the greatest of living French sculptors. Of the works by which he achieved and maintained his high position the following are some of the most celebrated—the dates are those of the years in which they appeared at the Exposition:—"Barberousse," executed 1826; "The Children of Niebe," 1822; "Psyche," 1824; "The Three Graces," 1831, now at Versailles; "Venus and Love," 1836; "An Odalisque," 1841; "Cassandra," 1843; "Phryne," 1845, well known in this country from having been placed in the Great Exhibition of 1851; "Sappho," 1849, a favour'd subject with him—there was a statue of Sappho in the Exposition the year of his death; "Spring," 1849: Hebes, Amazons, Pandoras (one of these is in the possession of Queen Victoria), the Achaeans, the Medallists, make up the list of that class of subjects in which he chiefly excelled, and which was most characteristic of his chisel. He also produced a large number of religious pieces, and many of them of considerable size, but out of France they have hardly reached a coloured figure in "Christ on the Cross," executed for Prince Demidoff; a "Pieta," executed in 1847, and now at Toulon; a "Marriage of the Virgin" for the Medallists, four "Apostles," a "Virgin" for the cathedral of Chartres, &c. Of portrait-statues he sculptured Gaston de Foix, Marshal Soul, General Damremont, Vendôme, Rousseau (for Geneva), Jouffroy (for Basancon), the Duc d'Orléans, &c. He also executed busts of Louis XVIII., Charles X., and other persons distinguished by their rank or social celebrity. Among his other works may be mentioned the tomb of Napoleon I., some fountains, vases, &c. He likewise modelled numerous small statues of a very meretricious character.

In 1822, he was made a Chevalier of the Legion of Honour. In 1827 he was elected Member of the Institute on the death of Lemot. He died somewhat suddenly on the 5th of June 1856. There were two or three casts after Pradier among the modern sculptures in the Crystal Palace at 1851.

PRAED, WINTHROP MACKWORTH, son of Mr. Sergeant Praed, was born in 1802. In 1820 a monthly magazine appeared, entitled 'The Etonian.' George Canning, while at Eton, wrote some clever essays in 'The Microcosm.' "The Microcosm" (afterwards Stanley Ford de Redcliffe) subsequently produced 'The Miniature.' These publications were regarded as exhibitions of youthful talent, were admired in a small circle, and forgotten. But 'The Etonian' at length found a publisher; it paid slight regard to the 'microcosm' of Eton, and presented no 'miniature' of its scholastic life; it gave vivid pictures of general society; it was bright with wit and poetry, with fun and satire. There was little of the boyish fun about it but of boyish life; it is the tale of the life of a boy named John in 'The Etonian' was Winthrop Mackworth Praed. From Eton to Trinity College, Cambridge. His career at the university corresponded with the expectations that had been formed of him. In 1822 he was a Browne's Medalist both for Greek ode and epigrams. In 1823 he obtained the Chancellor's prize for an English poem, 'Australia;' and in 1824 the same prize for 'Athens.' He was one of the first who read the school play of the famous Dillydally, Society—his most formidable rival being Thomas Babington Macaulay, 'The Etonian' was printed at the office of Mr. Knight, then editor of the 'Windsor News-paper,' and the intimacy that consequently arose led to the publication of 'Knight's Quarters Macaulay's' in 1824; in which Mr. Praed was one of the chief contributors, both in prose and verse. His poems are amongst the most original in our language; their wit and pathos are as remarkable as their finished elegance. A collection of some of these poems was published at New York in 1844, but it is far from complete; and those who desire that justice should be done to the memory of one of the most remarkable writers of his time, regret that these works, so often announced, should be so unaccomplished. Mr. Praed took his degree of B.A. in 1822. In 1829 he was called to the Bar; and in 1830 and 1831 was returned to Parliament for St. Germans. In the earnest and protracted conflicts that preceded the passing of the Reform Bill, he took a decided stand on the side of the Whigs. His life was full of events; full of events. In his speeches, as reported, exhibit a readiness of debating power rather than the flashes of wit which were expected from him. He was a most ardent supporter of the Whig administration, and it is far from certain that his vote for Mr. Canning in 1827, in his speeches, as reported, exhibit a readiness of debating power rather than the flashes of wit which were expected from him. He was a most ardent supporter of the Whig administration, and it is far from certain that his vote for Mr. Canning in 1827, in the controversy on the bill, was not the result of a wish to please his master and his party. In the event of 1832 he unsuccessfully contested St. Ives; but in 1835 he was returned to Parliament for Great Yarmouth. In that year he gave much of his time to the conduct of the Board of Control. He was subsequently member for Aylesbury, was Recorder of Barnstaple, and Deputy High-Steward for the University of Cambridge. Had Mr. Praed's life been longer spared, there can be little doubt that some of the most important offices of the state would have been within his reach; and his contributions to literature, like those of his friend Macaulay, might have carried forward the promise of his youth into new fields of excellence. He died on the 15th of July 1836, aged only 34 years.

PRASCOLITE. [MINERALOGY, S. I.]

PRASILITE. [MINERALOGY, S. I.]

PREROGATIVE COURT. One effect of the transfer of the jurisdiction of the Prerogative Court from the Court of Probate [Probatists, Court of, S. 2.] is, that the doctrine of the "notitia" has ceased to exist. This court, whose jurisdiction arose from the possession of bona notitia by the deceased person in two diocces, has consequently, although without formal abolition, altogether disappeared from our judicial system.

PRESCOTT. [LANCASTER.]}

PRESCOTT. [CANADA, S. 2.]

PRICE, REV. THOMAS, one of the most distinguished Welsh scholars of his age, was born on the 2nd of October 1757, at Pensereilin, in the parish of Llanafan Fawr, near Builth, in Brecknockshire. His father, the Rev. Price, had originally been a stonemason, but having at the age of seventeen found a place in the church, he was admitted to the sacred order by the abbot of Peterborough, and afterwards to the ordinary. He was the descendant of a long line of clergymen, who had acquired by incessant diligence and frugality the means of attending the college-school at Brecknock, and finally obtained ordination from the Bishop of St. Davids, and in 1784 the land he sought, after a course of twenty years. He was so fortunate as afterwards to be presented to three livings, but his income, like that of some other Welsh piutistels, was never believed to exceed fifty pounds a year. He had two sons, both of whom were educated to the church; the elder taking his degree at Oxford, while the younger, William (Canning of Stran- ford de Redcliffe) subsequently produced 'The Miniature.' These publications were regarded as exhibitions of youthful talent, were admired in a small circle, and forgotten. But 'The Etonian' at length found a publisher; it paid slight regard to the 'microcosm' of Eton, and presented no 'miniature' of its scholastic life; it gave
French. In 1813 he received holy orders, and in 1825, after performing for thirteen years the duties of various curacies near Crickhowel, he was appointed to the vicarage of Cwmmo. This was his last preferment. The rest of his life was passed in the pursuit of professional labour, 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 invention to Queen Charlotte on Palais-Royal in 1843. He made a great number of drawings, 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 Eisteddfods, or meetings for the cultivation of Welsh literature, and received much applause for the manner in which he donated most 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 Cwmmo on the 7th of November 1846.

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., Svo, Llandovery, 1854-55. The first volume contains an account of a ‘Tour through Brittany’, made in the summer of 1829, 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 the French, together with a view on the condition 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 the Beginning of the Eleventh to the Beginning of the Fourteenth Century’ (in the fourteenth, make up the remainder of the first volume. The second is entirely occupied with Miss Williams’s memoir, which is enlivened with some interesting correspondence, and presents the fullest picture that has yet been drawn of a Welsh literary life. By far the greatest part of Mr. Price’s literary labours were in his native language; he was a contributor to fifteen Welsh periodicals, for the encouragement of which he made a rule, once a month, to write an article on some subject. He was one of the most eminent scholars of his time that would now be impracticable to form a collection of the whole. His favourite signature however was ‘Carnhuanawc’ (‘Man of the Sunny Mound’), which was familiarly known to every magazine-reader in Wales. He was a great naturalist, and his work in Welsh on the natural history of Wales, ‘Hanes Cymru a chenedl y Cymry o Cynoesod y hyd ar Farwolch llewelùn ap Gryfudd’ (‘History of Wales and the Welsh Nation from the Early Ages to the Present Day’), where he proved that the 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 1844, the whole forming a volume of about 900 pages. It has been translated into English, and is reprinted, and is the best work on the condition of the Welsh country 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 contradiction to the high appreciation of Welsh literature among Welshmen and the superior knowledge and desire for information on all subjects connected with the principality by German scholars.

On the subject of his native language Mr. Price was so enthusiastic that his feelings sometimes outran his judgment. At the Eisteddfod at Whelba 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 answer them by making it last. We are not prepared to goad to it—when we are taunted 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? With the same energy with which we present the English asleep with the Latin, the Saxon, and the Norman French, let our mountain tongue may yet rouse 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 notice of Mr. Price’s, to which he appears to have attached considerable importance, was, after communicating it to the ‘Journal of the Asiatic Society of India’, 1828, published the subject of a separate communication, ‘The Geographical Progress of Empire and Civilization’ (Llandover, 1847-49). Every one is familiar with the idea of the ‘western progressive movement’, and Mr. Price was a prominent member of that. Mr. Price fancied he had made a discovery, ‘that the average rate of progress corresponds with that of the retrogradation of the equinoctial points, which is 50 seconds and a fraction in a year; and a voluntary movement is subject to periodic retardations and accelerations.’ ‘The focus, or pole, was in 1847,’ according to his speculations, ‘located in the northern portion of this island, near the Firth of Forth in Scotland, moving in the direction of the Solway Firth at the rate of four miles a year.’ All the whole, Mr. Price’s works are more remarkable for vigorous, animated, and learning, than for sound judgment.

PRICHARD, JAMES COWLES, an eminent ethnologist, was born at Ros 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 whole life. ‘The Natural History of Man,’ published 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, reached a second edition in two volumes in 1829, 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, with the corroborative narrative of that 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 man. 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 Race.’ As a result of this he published ‘Researches into 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 almost every paper in the scientific periodicals to which he contributed. The twelfth volume of the proceedings of the Zoological Society is a paper ‘On the Crania of the Laplanders and Finns.’ He also published a work ‘On the Eastern Origin of the Celtic Language,’ in which he pointed out the relations between the Celtic language and the great group of Indo-Germanic languages derived from the east. Another work also arose out of his ethnological researches, which was entitled an ‘Analysis of Egyptian Mythology.’

All of 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 psychologise generally, and he addressed himself successfully to the study of the nervous system, and the results of its deranged condition on the mind of man. In 1828 he published a work ‘On the Diseases of the Nervous System.’ This was followed by a ‘Treatise on Insanity.’ In this work he proposed a classification of attacks of insanity, and speedily became recognised as 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 Nature and Treatment of Manias’ and his 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
mentioned, Dr. Pritchard enlarged an essay which he had before the Philosophical Society of Bristol into a work entitled "A Review of the Cyclopedia of Practical Medicine." He was also an extensive contributor to the 'Cyclopedia 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 meeting of the Incorporated Society of Apothecaries held at the old Hall, now the Bristol Medical Association. He was president of the Ethnological Society, and published an anniversary address delivered before that society. He was a Fellow of the Geological Society, and a member of the more scientific societies in this country and on the Continent. He died in London, December 22, 1845, of an attack of rheumatism complicated with pericarditis.

PRIESSNITZ, VINCENZ, the founder of Hydropathy, or the treatment of disease by baths, was born on the 4th of October 1799, at Gräfenberg, in Austrian Silesia, where his father was a farmer. He received only a small amount of ordinary education at the town-school of Freistalau; for his elder brother having died, and his father become blind, he was obliged at an early age to assist his mother in managing and working the farm. He continued in this employment several years; but one day, when he was taking some sacks of barley to the fields for sowing, the horse became restive, seized the driver's cap and dragged the loaded cart over him, broke two of his ribs. A medical man, after examining him, expressed an opinion that the injuries sustained were so great that, even if he recovered, he would be a cripple for life. Priessnitz, however, by perseverance and self-discipline, enabled himself to expand his chest to the utmost extent, replaced his ribs, and by the free use of cold water kept down inflammation; so that in a short time he was enabled to return to his work. The prospect of a cure by cold water, which had been so beneficial in his own case, was successfully used in other cases of inflammatory disorder. His reputation gradually extended; he studied medical books, formed a sort of system of medical treatment, established cold-water baths at Gräfenberg, and afterwards at various other places in the distant parts of Germany. In 1829 his system may be said to have been in full operation, and from the first of January of that year till the 1st of January 1844 the number of his patients had amounted to 5672. The total number of his patients in 1844 was 1000, and the number of both sexes and all ages generally present at Gräfenberg was about 360. No particle of medicine, vegetable or mineral, no tonic, no stimulant, no emetic, no purgative, was ever administered in any manner whatever, except water, which was never once, with or without the assistance of the patient employed. Water variously applied, externally as well as internally, the process of sweating, fresh air, out-door exercise, plain diet, regulated clothing, early hours, and cheerful society, constituted the only remedies. This system contains a system for the treatment of diseases which occurred on the 28th of November 1851, at Gräfenberg. The disease of which he died is stated to have been dropsy on the chest. Hydropathic establishments are now in being in various places on the Continent of Europe, in the United Kingdom of Great Britain and Ireland, and on the continent of America.

Priessnitz did not write any medical work himself, but accounts of his system have been published in German and English. Captain R. T. Claridge in 1842 published 'The Water-Cure, or Hydropathy, as practised by Vincent Priessnitz, at Gräfenberg, Silesia, Austria,' 5vo, London; and 'Every Man his own Doctor: the Cold Water, Tempid Water, and Friction Cures, as applicable to all diseases which the Human Frame is subject to, and also to the Cures of Diseases in Horses and Cattle,' 5vo, London.

(Vincenz Priessnitz, eine Lebensbeschreibung, von Dr. J. E. M. Selinger, 12mo, Vienna, 1852.)

PRINCE OF BOROUGH, [THE HON. HAMMBURGH.] PRINCIPLES OF BOROUGH, [THE HON. HAMMBURGH.]

PRINTING, INVENTIONS IN. Since our account of Cowper and Appleth's machine for printing 'The Times' newspaper ['Printing Machine, vol. xix. p. 151], a number of improvements have been introduced. Steam power has also been added to the machine. The Stanhope press, in which the machine, of a form of type at each end, moves backward and forward under the platen, which gives the impression to one form while the other is being inked by the jet of ink; and the type is of a size which for a time supposed to be adapted for the finer sorts of book-work; but the process was very much slower, and the
In this machine a central drum 200 inches in circumference, or 66 inches in diameter, turns on a horizontal axis. We copy the following description from C. Tomlinson's 'Cyclopedia of Useful Arts and Manufactures.' "The inking-table and the columns of type are secured to the surface of this drum; the columns of type are placed vertically, not being parallel to the axis of the drum, but turned in the following manner. A slab of iron is curved on its underside, so as to fit the large cylinder, while its upper surface is fitted into facets, or flat parts, corresponding to the size of each letter 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 prevent the type from falling in other ways, or in the direction of the lines; the type is pressed together in the other direction by means of screws, and is firmly held together. The surface of the type thus forms a portion of a polygon, as already noticed; and the regularity of the impression is obtained by pasting slips of paper on the paper cylinder. The large central drum is surrounded by eight cylinders, each about 13 inches in diameter, also with vertical axes. They are covered with cloth, and upon them the paper to be printed is placed in contact with the type cylinders. Each is so connected with the central drum, by means of toothed wheels, that the surface of each must move with the same velocity as the surface of the drum. It will thus be evident that the type must be moved eight times during one revolution of the drum. This is accomplished by means of eight sets of inking rollers—one for each paper cylinder. The ink is held in a vertical reservoir (supplied from above), formed of a heavy roller-agate which rests the two straight edges connected at the bottom, so as to project into the features of the inking rollers. It is conveyed from the doctor-roller by one of the inking rollers in the following manner:—As the inking-table on the revolving drum passes the doctor-roller, it receives from it a coating of ink, and then coming immediately in contact with the inking rollers, it inks them, the type next follow and receive from the inking rollers their coating of ink, and the drum still revolving brings the type into contact with the paper roller, and the sheet is printed. It must not be forgotten, as one of the distinctive features of this machine, that the various processes which have just been enumerated for one set of inking rollers, and one paper cylinder, are repeated eight times for every single revolution of the drum. Thus a whole sheet of paper is printed, and turned out of the machine. For this purpose it is necessary to supply the eight cylinders each with a sheet of paper. Over each cylinder is a sloping desk, upon which a piece of white paper is placed. The layer-on stands by the side of this desk, and passes forward the paper a sheet at a time towards the tape-fingers of the machine. These tapes seize it and draw it down in a vertical direction, between tapes, in the eight vertical frames, until its vertical edges correspond with the position of the form of type on the drum. When in this position its vertical motion is arrested for a moment, then it moves horizontally, and is carried towards the printing cylinder by the face of the drum. Passing round this cylinder it is instantly printed. It is then conveyed horizontally, by means of tapes, to the other side of the frame, and is moved along to another desk, where the taker-off pulls it down. As soon as one sheet is thus disposed of, accommodation is made for another; and as each layer-on delivers to the machine two sheets in five seconds, sixteen sheets are thus printed in that brief space, and this is continued for any length of time, supposing no accident occurs, such as a sheet going wrong, in which case it is the duty of the taker-off to pull a bell-handle, and the machine is stopped. As the type-form on the central drum moves at the rate of 70 inches per second, and the paper to be printed moves at the same rate, if any error in the delivery and method of the paper arrives, the result is a 70th of 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 1-700th of 70 inches, viz., one inch; in which case the edge of the printed matter on one side will be an inch nearer to the edge than on the other side. It is only by an accurate setting of the machine that it has to do, is to draw forward the sheets so as always to have the edge of one ready for the machine to take in. If the steam-engine which works the machine be put on a greater speed, the central drum, and all the attendant parts would move with a motion so rapid and such a speed might easily be obtained as to render it impossible for the layers-on to present the paper fast enough to satisfy the improved appetite of the machine; but in any case it must be kept moving so that the hands must be kept 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 on a large size, has been used 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, likewise on the same principle, has been invented by the Messrs. Hoe, of America, and several of these have been brought into use in London. The inventive faculty has also been applied to methods for facilitating the arrangement of the type, though with far less success. Mr. Knight, in his work on Printing, and, also, at 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 the work which is done by the printer himself. Without attempting to describe the various contrivances by 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 the compositor. He has only to make his selection, 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. Then he spaces out the words, 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 would be rendered as unnecessary as that of the person who, in printing a newspaper, is called of each 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 quicker manner of setting the type more rapidly than by the fingers. In a trial of comparative expedition between the logographic system of Major Bemiowski, 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 justified 8000 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 appears to me, 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 a composer et metre bas pour l'usage de Dimpriming, composé et exécuté par Christian Sirenen.' 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 briefly to state the principle:—"The type are of the usual thickness and height. In the centre of each type, in the front, is a deep nick of a dovetail shape, which fits on to a metal edge, so that the type cannot be displaced. But of 111 letters in all, there are only three or four, cut at right angles, the nicks of no one 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, but being the matter for distribution, are rapidly said by the dovetail nick.
When the basin is filled, it is inverted upon a cylinder of corresponding 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 receiving ends of the separate letters are each of them represented by a small aperture. The composition is seated; with a tredle 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 having four sides cut and two transverse slits into its own division, and cannot be confused with the n.

"But whilst this process of distribution is steadily proceeding, without any care but to keep the upper cylinder occasionally supplied with new material for its operation, the process of composition is rapidly going on. The compositor 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 arranges itself in its proper order, in the line of its fellows. This is a long line of several feet. By an ingenious contrivance each line is passed on one side, as it is completed, to another workman, who puts it in order 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 matter of composition of ordinary length. The rapidity in rendering the loss of time in refilling the cylinders, and through other hindrances, is taken into account, it was stated by the exhibitor that 80,000 types are set up and distributed each day. This gives a rate of about 1000 an hour, which is treble that of the ordinary compositor’s rate.

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 gulden prize of 100 guineas to the best type, is greatly to bring about a change in the intellectual education of the blind. The publication of the article Bunsen 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. S. G. Howe, of Boston in the United States, in 1833 contrived an alphabet, founded upon that of Haly, of a very compact form and shape, by which it could be printed with great facility, and is now in general use in America. The late Mr. John Alston, the treasurer of the Glasgow Asylum, then no man connected with the blind deserves more honourable mention, contributed greatly to this educational movement; for more than one registrar of wills or less arbitrary, the evil would necessarily follow of isolating the blind by putting them in a position to require special teachers. He therefore adopted the plain Roman characters deprived of their small extremities—the same serif of type-founders; and, finding that it could be easily read, that it would also enable any seeing person who could read to be a teacher of the blind, he at once procured founts of type, and published several works in raised letters; the success of these for the benefit of the blind is well known. The most important of these is now in the possession of the British Institute in Paris. Having thus laboured for several years, he visited more than once the principal asylums for the blind in the kingdom. In his work ‘Statements,’ &c. published in 1846, 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 the ‘type language’ who could not read at all the characters of the whole of the Bible in raised types; thus in a short time showing the sufficiency of the system placed before the public.’ It may be added, that Mr. Alston also brought out some beautiful embroidered muslins and maps, and that he published a ‘New Testament’ in official type; the size of type being only 32 and 4to. The paper used for these works is strongly sized, to retain the impression. In order to account for the great extent 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 type is being strongly relieved, and liable frequently to give way under the heavy pressure required, it was necessary to have the type made in one piece, in order that the progress of the work. The whole of the works were composed in the printing shop of the Glasgow Asylum, a man and a boy acting as compositors, there being one pressman, and the ordinary teacher acting as corrector of the press. These books are now used in the most of the Edinburgh asylums for the blind, and in the United States and Scotland. The success which has attended Mr. Alston’s exertions was a new assurance to the Society of Arts for Scotland that they had acted wisely in regarding the steno- graphic and typographical characters, as well as the angular modifications of the Roman alphabet, as reclaimably.

An invention by Alois Auer, of Vienna, called ‘Natur- selbstdruck,’ deserves mention. By it 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 ‘Pern Flora of the United Kingdom,’ produced by him in a folio volume, with 51 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 a gentle current of air. The metal being thus forced out and delivered off 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 moulds are liable to become obstructed by particles of the metal remaining, when it has to be brushed clean. When this happens to the machine, it ceases to act, and thus at once informs the operator of the defect.

PRIVY COUNCIL. [JUDICIAL COMMITTEE, S. 9.]
PRONOUNCED CORRECT. The registering letters of administration of the effects of persons dying intestate, and probate of the wills of testators, which was formerly the prerogative of the Ecclesiastical Courts [Ecclesiastical Courts, S. 5, p. 603: has by a recent statute (30 & 21 Vict. c. 77) been vested in a newly established court, called the Court of Probate. The functions of this court are confined entirely to deciding upon the authenticity of wills, and upon the proper persons to whom administration is to be granted. It has jurisdiction over the property of deceased persons, and the rights of the various 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 registrars under the Act are to receive applications for the appointment of the personal representatives of deceased persons. A central registry 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 registry districts, the application for probate or administration may be obtained at the registry of the district. The executors or parties claiming administration may, if they think fit, apply to the principal or metropolitan registry for probate or administration, and this may in some cases be found more convenient than applying to the district registry. Original wills proved in the country will be preserved in the district registries; but copies of them will be transmitted to the principal registry in London, so that in most cases the same copy will serve for the purpose.

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 solicitors is abolished.

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 died in one of the forty districts,
leaving personal property under $300, and real property under $300; 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 remarkable increase in the quality of the probate, which equals the improvement in the question of bona nova notabilia, and the necessity of obtaining prerogative probate or administration was founded. The rules of evidence in the Court of Probate are to be the same as those in courts of law and equity, where declaratory proceedings are either admissible to those of the courts of common law.

PRODUCIÆ, a family of Brachiopodous Molusco, including the genera Productus, Strophopala, and Chonetes. The shell consists of two valves, arranged in a straight-hinge line; valves rarely articulated by teeth; closely appressed, furnished with tubular spines; ventral valves convex; dorsal concave; internal surface dotted with conspicuous funnel-shaped punctures; dorsal valve with a prominent cardinal process; branchial processes (f) subcentral; vascular markings lateral, broad, and simple; adductor impressions denticulate, separated by a narrow central ridge; ventral valve with a slightly notched hinge-line; adductor sac central, near the umbo; cardinal impressions lateral, striated.

Productus has the shell, oval, arculate, beak large and rounded; spines scattered; hinge area in each valve linear, indistinct; no hinge-teeth; cardinal process lobed, striated; vascular impressions simple, curved; ventral valve deep, with two folds; dorsal valve entire.

The species are all fossil. There are about sixty species. They are found ranging from the Devonian to the Peruvian rocks of North and South America, Europe, Spitsbergen, Tibet, and Australia.

Strophopala has its shell attached by the umbo of the ventral valve. There are 8 species.

Chonetes contains 24 species, which are found fossil from the Silurian to the Carboniferous rocks.

(Woodward, Transactions, 5: Fossil Shells.)

PROME. [HRMA; PIIH, S. 2.]

PRONGBUCK. [ANT.]

PROPOLIS. [BEE.]

PROXYLITE. [Sylvis, S. 2.]

PROTECTION ACTS. The object of these statutes is to enable a debtor in insolvency circumstances to avert or forestall the impending danger of imprisonment; for any person not a trader within the Bankruptcy Acts, or who, being a trader, owes less than $300, whether in prison or not, may apply in London to the Insolvency Court, in the county to the County Courts, for protection from process. A schedule of debts, and of the names of his creditors, must accompany the petition; which must set forth an account of his whole estate and affairs. The insolvency court determines the effect the petition has on the debtor’s discharge. The presentation of the petition vests all the petitioner’s rights in the registrar, who, as official assignee, proceeds to possess himself of all that can be obtained without suit. Notice of the petition is given to the creditors, and inserted in the ‘Gazette’ and local newspapers, a public sitting of the court being at the same time appointed for the first examination of the petitioner. If it appear that the allegations in the petition and the matters in the schedule are not true, or that the debts do not have been contracted fraudulently or improperly, and do not arise from any of the acts of misconduct enumerated in the statutes, a day is fixed on which a final order shall be made, unless cause be shown to the contrary. If made, its effect is to permanently protect the petitioner from all process, in respect of the debts due, at the time of filing the petition, to the creditors named in the schedule. On the other hand, if cause is shown, the court may adjourn the consideration of the final order sine die.

At any time after the final order, the assignee of the estate may claim property since acquired by the insolvent, which claim may be summarily enforced by the order of the court. So that under the Protection Acts, as in the case of an insolvent, the assignee in bankruptcy as well as the insolvent debtor may be applied in payment of his debts. In this consists the great distinction between the relief afforded by the bankrupt laws to a trader, and that obtainable by an insolvent debtor, or a petitioner under the Protection Acts.

(Blackstone’s Commentaries, Mr. Kent’s edition, vol. ii, p. 516.)

PROTEIN. [Chemistry, S. 1; Thermo, Organic, S. 1.]

PROTOZOA, a term applied by Oken to the lowest forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life. Protostoma has been applied to the same forms of animal life.

PROUT, 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 irrepressible spirit of observation and enjoyment, which, with the genius and the power of an artist, formed the subject of a design by him, and the passion increased with his years. His associate in his early artistic studies was Benjamin Haydon, but instead of yielding to the eager impulses after an unattainable gardeur of his enthusiastic friend, young Prout contended himself with unceasingly sketching from nature the ivy-mantled bridges, mossy water-mills, and rock-built cottages, 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, then at Plymouth on his way to collect materials for an account of Cornwall, which he was preparing for the ‘ Beauties of England.’ [Britton, John, S. 2.] Mr. Britton, pleased with his sketches, proposed that he should accompany him to Oxford and London, which he 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 arrived in London in 1805, and found an admirer and patron in Psler the printseller, then residing in the Westminster-road and afterwards in Street-street, who used readily to purchase his water-colour drawings, and dispose of them among his customers. Prout had a great deal of time to devote to 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 unambitious drawings, to support himself whilst making a valuable effort to extend his artistic knowledge and executive skill. During these years he painted marine views, especially coast-scenes with fishing-craft, more than architecture, for which a very decided inclination had not yet developed itself. He spent so much time to teaching, and he staked some lessons and studies for the use of teachers and pupils; but perceiving the capabilities of the newly-introduced art of lithography for yielding fac-similes of the painter’s pencil-sketches, he began early to draw on paper, which he afterwards transferred to stone, and on which 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.’ Progressing in his art, he published a series of drawing-books, which by their vigour of drawing and brilliancy of effect raised 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 professional account the taste for foreign scenery indicated by the frequencies of continental travel, and the return of peace—to make a tour in France. The quaint street-architecture of Rouen, and the civic and ecclesiastical structures of other Norman towns, seemed to reveal in him an entirely new sense. From this time he gave himself, 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, and of Germany, to the many places that still bore the marks of northern Gothic buildings that attracted his pencil, or those 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. This was the period that the author of ‘The Kestrel’ permitted him to publish 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-
PROT had correctly appreciated the importance of chemistry, in explaining the functions of living beings, and that he 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 considered erroneous, a more careful investigation has confirmed the truth of his views.

Dr. PROT was one of the gentlemen chosen to write the "Bridgewater Treatises." The subject of his essay was "Chemistry, and the Function of the Vibrating Retina, as 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 in all branches of his favourite science. 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 Fossils of Ichthyosaurus and other Animals." Dr. PROT was a Fellow of the Royal Society, and many other learned societies. He died at his house in Backwell Street, London, near the botanic garden, in the 9th of June, 1839, in the 60th year of his age. He was a man of exceedingly retiring habits, and greatly respected by those who knew him intimately.

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 1850</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Prussia</td>
<td>14,946</td>
<td>3,571,272</td>
</tr>
<tr>
<td>West Prussia</td>
<td>19,974</td>
<td>3,258,733</td>
</tr>
<tr>
<td>Posen</td>
<td>11,533</td>
<td>1,258,744</td>
</tr>
<tr>
<td>Pomerania</td>
<td>12,153</td>
<td>1,253,904</td>
</tr>
<tr>
<td>Silesia</td>
<td>15,695</td>
<td>1,571,173</td>
</tr>
<tr>
<td>Brandenburg</td>
<td>18,976</td>
<td>2,000,849</td>
</tr>
<tr>
<td>Prussian Saxony</td>
<td>9,747</td>
<td>1,929,732</td>
</tr>
<tr>
<td>Westphalia</td>
<td>7,796</td>
<td>1,504,251</td>
</tr>
<tr>
<td>Rheinland (Rhein)</td>
<td>10,759</td>
<td>2,972,130</td>
</tr>
</tbody>
</table>

Total: 107,954, 16,923,721

PSAMMA, a genus of Grasses belonging to the tribe Arundinaceae, is known by its flower being enveloped in long silky hairs, the lower glumes shorter than the upper, and its panicle being spike-like.

P. armeria, Sea- Reed, Maram, is the only British species. It is found on sandy sea-shores, where its roots assist in binding the shifting sands.

PSOLID. Equisetum, a small Equisetum, in the order Holohuridaceae. The only British genus included by the late Professor E. Forbes in this tribe, is Psolus, which is thus characterised:—Body irregular, asciiform; suckers in five rows, three only of which are developed and placed on a soft foot or disk; tentacle with' large, uniseriate, cirrate hairs.

P. phantopus (Holohuridura phantactus, Linnaeus), the Snail Sea-Cucumber, is an inhabitant of the British Seas. It is of a brown colour, has the head reddish-white with orange spots and orange tentacles, the body covered with pustulated scales, or ridges. It adheres to substances with great firmness by means of its ventral disk. "So powerfully does it adhere," says Professor E. Forbes, "that I have known the head of the animal carried away by the dredge when it brought up entirely every other foreign body that was in contact with it." It is found in European seas, and the genus ranges to the Indian seas. Professor Forbes says, "the Psolus teresornia of Jager and Lesson, should form the type of another genus, distinguished by its twenty tentacles. The genus Equisetum should be united with Psolus." (Forbes, History of British Star-Fishers.)

PUBLIC HEALTH. The general interest taken by all classes in whatever concerns the public health, and the still growing desire for a supply of pure water, is in this year, evident, which form so marked a characteristic of the present age, may be said to have received their earliest impetus from the "Inquiry into the Condition of the Working Classes," which resulted in the passing of the Poor Law Amendment Act of 1834, and of the Act of April 1856, for the formation into existence by that Act. The Commissioners appointed to conduct the preliminary inquiry were made conscious of a state of things connected with the dwellings of the working
classes, their social circumstances, and their physical condition generally, far more unfavourable than they had previous to the observation, and conditions which 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 Parliament, the observations of the Commission were 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 early in 1842, and the first step was the appointment of 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 Board, were published to check the supplies of the districts, vice, misery, and disease, as the direct and almost inevitable 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 parts of the country, and what relief could be afforded to the distressed. The House resolved that an inquiry should be held, and the result of the inquiries made by the Board, the local investigations were carried on mainly 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 the large number of information the Board were 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 in Great Britain, printed 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 remediating 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, and which were in fact here firmly sketched. We must not, however, omit to mention, in noticing these pioneers of sanitary improvement, the very important statistical researches of Dr. James Stawell and Mr. John Snow, which were carried 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 direction to the operations of the other inquiries.

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 immediately 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 the impaired physical condition, the inhabitants were the earliest and most susceptible of the attacks of other epidemics. 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 42 annually of the whole population, in one district where 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. As the Board had power to provide for the execution of 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, to investigate the whole subject; and various questions connected with the public health. The evidence collected entirely corroborated that of the former commissions, of wretched wanderers and outcasts; Liverpool, with its 8000 damp cellars, and Manchester, with 50000 large houses opening directly into the street; Manchester, with whole quarters of narrow lanes and alleys, without any main sewer, unvisited by the scavenger, unprovided, almost impassable from mire, and reeking with filth and stench; the smaller towns, whether agricultural or manufacturing, with the want of necessary conveniences, were all insufficiently drained and ill supplied with water; all had their St. Gile's, their pestiferous lodging-houses, their fever-nests, their labourers' dwellings, where comfort and cleanliness were impracticable, and where pestilence and disease took the place of life.

In these statements the mass and in detail, it was impossible not to agree with the report that this was a state of things discrepant to the intelligence and civilization of the country, and that the removal of these evils was imperatively required. For, as Mr. Chadwick forcibly observed, it was incontestable, from the facts deduced, that "noxious physical agencies deprive 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 produces, a destitute population that consumes and destroys; that a generation that is young, inexperienced, ignorant, credulous, irritable, passionate, and dangerous, having a perpetual tendency to moral as well as physical deterioration." And happily he was able to show, that the removal of these evils, by the necessary measures, not only might the more palpable 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 period of life." 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 sewers, and for protection against fire; the enforcement of improved 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 of the Board of health, &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 and to carry them into effect." From estimates he was able to show that, whilst the expenses of executing these various improvements would in fact be a pecuniary saving, "by diminishing the existing charges attendant on sickness and premature mortality," those expenses might be met with facility by means of loans, on the security of the rates, the charge being spread over 30 years, during which the original outlay as well as the interest should be repaid, and thus be avoided "the oppression and injustice so repeatedly reviled for the whole immense tax laid on such works, upon persons who have only short interest in the benefit." 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 interments was also considered by Mr. Chadwick in a special report in the following year.

But, searching as had been the investigation, and unde-
and the conclusions arrived at were in effect the same as those of Mr. Chadwick. In their Reports, dated June 1844 and February 1845, they made great questions bearing on the sanitary regulation of populous places — sewerage, drainage, paving, cleansing, removal of nuisances, consumption of smoke, supply of water, public baths, &c., &c. The most fatal to the metropolis, the unhappy Backwell cases, and streets, and interment in towns — and found, almost uni-
versally, 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 make the laws of the metropolis more efficacious, before the improvements so much desired can be fully accomplished.”

Thus fortified, the ministers framed a bill embodying many of the provisions of their recommendations. The Bill was introduced into Parliament by the Right Hon. Lord Lincoln, 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 further.

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 consequence, the Bill had the support of the cabinet, the ministry he consented to withdraw the clause which included the metropolis within its provisions, he failed to carry the meas-
ure that session. In the next session it was again brought forward, and the clause which limited the powers of the Board of Health to the metropolis (an omission in the 1846 Bill) was inserted. There was a special meeting of the House of Commons out of doors, and the Bill, with a few amendments, received the Royal Assent.

The object of the Public Health Act of 1848, as stated in its preamble, is to make “further and more effectual provisions 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 sewerage, drainage, cleansing and paving 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,” consisting 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 153 clauses; but as it is an Act of the greatest possible importance, as forming the basis of subse-
quent sanitary improvement, it seems advisable to indicate briefly its leading provisions—as, for a similar reason, we have entered at some length into its history.

1. As to the application of the Act. It was in no case 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 20 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 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 applied, and in such case, if the application of the 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 prov-
isions 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 of the local board of guardians. In each case the entire sanitary government is vested solely in the Local Board of Health.

2. As to the powers of the Local Board, it is imperative on them to provide for the supply of water, public baths, &c.; for the construction of public conveniences; 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, &c. The Board are to make rates for the purposes of the Act, the ratepayers to be assessed accordingly. The times proper cause 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-
healthy places to be purified and whitewashed. The Board may also provide a constant supply 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 consent of the local board has to be obtained, before contracting to purchase old, or to construct new water-works or gas-works. The office of surveyor of high-
vays is vested in the local board, who must see that the highways are properly formed and lighted; that new streets are formed, and that all new buildings are in accordance with the terms of the Acts of parliament.

3. The local boards may, subject to the control of the General Board, close any surcharged burial ground, and provide general cemeteries for persons of all religious denominations.

4. Subject to the control of the local boards, the General Board may levy taxes, and for the construction of any per-
manent work may—but only with the sanction of the General Board—borrow money, to be repaid with interest, by means of a special Act of parliament. Provision is made for appeal, in various cases, to the General Board, on the part of persons who regard as excessive the assessments or charges made upon them for private improve-
ments, and also against various orders of the board which may lie open to the appearance of being partial or oppressive to individuals.

The intention of the Act in respect of local management and central control has been, in short, to cast upon the inha-
bители of a town the duty of making provision for the public health, and of carrying out local improvements, by means of a local agency elected by, and responsible to, the rate-payers; while, in order to ensure the efficiency of the more costly and permanent works and their economic construction, the fit qualification of the sanitary officers, the security of indi-
viduals from local bias and oppression, and the assuring of future rate-payers from the burdens arising out of an un-
thriftily mortgaging of rates, a General Board is provided with a certain well-defined power of supervision and control. Mr. Chadwick, who, beside the Reports noticed above, had taken a leading part in inquiries embodied in two other reports on the water-supply and the drainage of towns—in the former of which he strenuously advocated the adoption of the con-
clusion of the report of the Select Committee of the House of Commons, that the lucid exposition of the advantages of drainage by glazed earthenware pipes—was one of the members of the General Board appointed under the new Act; and to his intimate acquaintance with the whole subject, and well-directed energy, its early success must mainly be attributed. Subse-
quent acts, continuing, and in certain minor points amending, the original Act, have been passed; and in 1854 one by which the General Board was re-constituted, under the pro-
visions of which the Board consists of a President, the principal Secretaries of State, and the President and Vice-
President of the Board of Trade.

There appears, however, a probability that the great principle of the Health of Towns Act, local agency combined with central control, is about to be abandoned; a bill having been introduced (April 2, 1858) by the present government, with the declared in-
tention to “decentralise the whole system.” It proposes to allow the General Board of Health to cease to exist, in the middle of 1858; and to enable the ratepayers of towns to constitute local boards, which, as well as the existing local boards, “shall have the amplest powers of self-administration, and shall no longer be subjected to the necessity of referring to the Central Board.” It is not improbable that it is to be aggrivated are to have a power of appeal to the Secret-
ary of State for the Home Department. In its present crude shape the bill is unlikely to become law, but as it is a concession to a popular delusion against the alleged “stairs” and “dangers” here in the Act, and its features, be adopted; and thus the accumulated experience and scientific informa-
tion of the officers of the General Board will be lost, and the
door opened wide for a return to the old apathy, mismanage-
ment and negligence, to local inefficiency, waste, peculation,
and favouritism. The "general medical functions of the
Board of Health" are to be dealt with in a separate measure,
"they being distinctly central and governmental functions."

Since the passing of the Health of Towns Act, applications
have been made by several hundred places 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 "enormous modifications" introduced by
the Law Reform Act, the Sanitary 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 in recent applicants for the-passage of the Health of
Towns Act to the present day, and extending over almost every
district of England and Wales. We have 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 cognizance of the Health of Towns Act, including
sea-side and inland watering-places and resorts of invalids;
mining and manufacturing towns and villages in the north
of England and of Wales; rural towns of the eastern, southern,
and western counties of England; but curiously, they, after all, but tell, with variations, the same sickening
story of wretched quarters—often in close, though scarce
suspected proximity with the open and airy dwellings of the
afflicted, dilapidated, loathsome from without, without the
commonest appliances for decency, with an insufficient
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 a fever-thatched hell, dilapidated, loaded with
all their abominations, in the midst of the most densely
populated localities; burial grounds surcharged, and the
like—all seemingly continued in defiance of sanitary
principles the most obvious to the commonest understanding,
but, in truth, usually continued through sheer ignorance or
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. The case, therefore, now moved also, reference to
our 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 disclo-
sures respecting our barracks at home, more than sufficiently
prove the necessity for constant and judicious watch-
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
Borphorus and in the Crimean camp, twice, more than once, and
precautionary measures of the Sanitary Commissioners,
sent out from England in January 1855, 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 bar-
racks in England—a fact which renders the more strange and
important, as the removal of which barracks should after-
wards have been suffered to continue.

Up to the end of 1857 about 250 places had been brought
under the operation of the Health of Towns Act. In a fair
proportion of those places sanitary works of an efficient
order have been executed. The sanitary works have,
moreover, 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 earthworks pipe
drains, and their connections to the new water-courses, in
their place or peculiarity of site, the local boards have in most
instances been enabled to effect thorough drainage with com-
parative readiness and economy. The utilisation of the
sewage, however, has not, however, been brought into general
successful operation; and in a small number of cases it has
been 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 utilisa-
tion 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 very generally satisfactory,
and now in numerous places where only a scanty supply of
water had heretofore been had, water of the purest quality
is abundantly provided with water of excellent quality. And
wherever these sanitary works have been judicially
planned and properly carried out, there has followed a marked
improvement in the general health and comfort, while the
sanitary reforms have been accompanied by a marked
increase in the birth rate, a decrease in the death rate, and a
fairly reduction in the rate of mortality. The usual
mean duration of life in the town has been lengthened. The
application of sanitary measures has not however been con-
fined to the towns under the Health of Towns Act. Several
practicably all the large manufacturing towns have benefited
by local acts. At Liverpool and Manchester, for instance, vast
and very costly works have been constructed for bringing to
those places a supply of pure water from a considerable
distance; and at Glasgow a similar supply has been obtained,
at a great expense, but apparently a permanent advantage.

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 some sanitary supervision was ad-
mited on all hands, so strong was the feeling of the civic
corporation and the parish vestries against centralisation
of authority, that it was not until 1855 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-
ever a far longer and more cumbersome measure than the
former (it contains 261 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
cabinet and departmental councils, to deal with 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
creets, and the direction of the public works, including
the parks, &c. 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
protection and regulation of the water supply and the
creation of those parks and grounds which were necessary
for enjoyment and recreation within those towns and
suburbs, &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 was to have been, a board of executive
action. The Health of Towns Act, and special Acts similar to the
Metropolis Local Management Act, would probably well suit,
if properly carried out, for the sanitary regulations of the
villages and small towns, but it is not yet to be said that 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 evils which have arisen from the urban
regulation of 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, which too are to be regarded as in the same spirit. The Nuisances Removal Act (1848) 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 the county borough of Towns as in such places 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 Acts.

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; whereas the Act directed that the powers of the corporation directing burial be wholly discontinued 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 the construction of spacious and neat cemeteries on all sides, but at some distance from the metropolis, though the actual accomplishment of these objects has been, I believe, successfully carried into effect; a new State for Home Affairs. An Act was passed the following year amending the Burial Act of 1850, and extending its provisions to any city or town in England. Another enactment was passed in 1857. In 1856 was also passed an Act bearing on the health of young persons and females working in factories, by which, as amended in 1858, the period of labour of such persons was restricted to between the hours of six in the morning and six in the evening, or during winter from seven to seven, and on Saturday to eight to eight.

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 the Metropolitan district of London. The Act was passed in 1850 but the measures were required, what has been already said will have sufficient to show; but as the power of entry and search is still by some regarded as oppressive, an instance or two, exhibiting in detail the true character of such places immediately before the passing of the first Act, from the reports of the superintending inspectors of the Board of Health, may not be superfluous. But we shall only give one or two instances; for such details though it is wise to shun one’s eyes to their reality, are too painful and humiliating to dwell on; and we select them not from the great centres of population, where their occurrence is more frequent, but from the borough of Southwark, where their existence might hardly be anticipated. In Bacup, Lancashire, 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 week, nine illegitimate births, nine smallpox cases, and dog. . . ." In another he found in one room 7 beds, containing 7 females and 9 males. But bad as this seems it is purity itself in comparison with what has been found in other parts of the country. Thus at Cardiff Mr. Ratcliffe, in a recent visit to that town, gives plans of a street (Stanley-street), several of the houses in which are common lodging-houses. One, No. 17, is larger than most others in the same street. Like the rest it has but a single living room, which is 16 feet 10 inches long, 17 feet 5 inches deep, and 8 feet 11 inches high. This room the Superintendent of Police visited by Mr. Rammell’s desire. On the first visit he found in it "54 persons, men, women, and children; they live, eat, and sleep all in this one room." He visited it again the following day, and found it only more crowded, but many more came in to sleep at nights. . . . There are no bedsteads, but all the lodgers lie on the ground or floor. . . . Each party had with them all their stock, consisting of heaps of rags, bones, salt-fish, rotten potatoes, and such things. The stench was hardly endurable. "This living room opened into a small outer court, in one corner of which was an open privy. On a third visit, seven days later, he found on the floor of the crowded room a woman who had been confined there during two days, on which occasion the privy had been closed; and these did not need "well-ordering", even at the risk of some little infringement on the owner’s right over his castle. The "well-ordering" Act has everywhere operated good; and as far as it has been realised the other has been extremely beneficial. The Smithfield Market Removal Act of 1851; and the Metropolitan 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 from the Thames, or from any streams flowing from it or its tributary streams below Teddington lock), are sufficiently referred to in the following article. [PUBLIC IMPROVEMENTS. S. 2.]

In 1855 was passed an Act which, as amended by the Act of 1857, renders it compulsory to have all furnaces employed for manufacturing purposes within the limits of the metropolis, and the furnaces of all steam-boats plying on the Thames, so constructed or altered as to consume their own smoke, a measure which has had the effect of greatly improving the London atmosphere. In the same year the legislature rendered the practice of vaccination compulsory.

In 1854 was enacted the Board of Health Reconstitution Act, and among other provisions, the Metropolitan Burials Act, and the Metropolitan Sewers Act, which have been already referred to. In 1855 were passed—extremely useful Act for the Inspection of Coal Mines, which may be expected eventually to effect important sanitary improvements in such places; an Act for the Better Prevention of Diseases, which gives the General Board of Health additional and stringent powers in case of the recurrence of any formidable epidemic, endemic, or contagious disease; an Act for the amendment and consolidation of previous Nuisances Removal and Disposal of Offences Acts; an Act repealing all previous acts and more strictly defining the powers of the various bodies appointed to enforce its provisions; an Act to amend the Laws relating to the construction of Metropolis and its Neighbourhood; and an Act for Facilitating the erection of Dwelling-houses for the Labouring Classes. Subsequent acts of a sanitary character have been chiefly emendatory.

Our review has been confined to England and Wales, and it is there that the greatest progress has undoubtedly been made. But in Scotland, by the very important ‘Act to make more effectual provision for regulating the police of towns and populous places in Scotland, and for paving, draining, cleansing, lighting, and improving the same’ (1830); the Burial Grounds Act (abolishing the system to that of England), and the Act to Facilitate the Erection of Dwelling-houses for the Working Classes (1855); and the Smoke Nuisance Abatement Act of 1857; and in Ireland by the towns Improvement Act of 1850, the Act for providing of Improved Dwelling-houses for the Labouring Classes (known as the Cotter Tenant’s Act), and the Burial Grounds Act (similar to the English Act) of 1856, very much has been done towards placing those portions of the empire on a level with England in reference to its sanitary provisions. Much doubtless remains to be accomplished in and for our populous places—indeed sanitary improvement can but be regarded as in its early stage of progress—but it is still possible that what has been accomplished within the last few years without thankfulness, or forward without hope. All that we have said has had reference to ‘towns and populous places,’ and it is in them that sanitary law has first need to be enforced. The average excess of mortality in town districts is at least 8 in the thousand over that of the country districts of England. Yet even in country districts, as was well observed by the
Registrar-General in one of his valuable reports (1868), "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 sanitary state of the town population has been almost in-
clusively 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—asserted of his belief that the mortality of London is still high, if we look at it from the present time to that in Europe,—saying "the sanitary condition of the rural districts:—
"The germ of insolvency are scattered about in every village; for the rational laws of health are violated alike in the sparsely inhabited districts of the county and in the close-housed and destitute districts of the town. Sometimes rest on damp undrained ground; they lie often at the bottom of pit-like depressions of the earth, instead of standing on the sides of the higher grounds, from which the water flows away naturally, and the decaying organiza-
tions are dispersed and decomposed by the winds. The farming house is often close to the farmyard, on a low part of the farm, and is surrounded by buildings, ricks, and trees. In the yard, or near it, the refuse of the house, and of all the animal and vegetable productions of the farm; butchers and giving off noxious vapours. Into the pond, out of which the cattle drink, the ammoniacal liquor falls that should find its way over the land. And it happens that if the air is stagnant for some days, if the temperature is high, if some sickly or diseased animals are near at hand, or if the land is surrounded by salubrious fields, the field becomes a scene of suffering, the cattle perish by pleuro-neumonias, the animals are attacked by scarlatina, the wife has low fever, or the farmer himself dies. It is impossible to tell where the name, enrolled in the register of deaths. About 6,400 English farmers die in a year, and of them many are young; 2,600 are under 65 years of age. In the dairy, a little dirt spoils the milk, butter, or cheese; unless the vessels of the brewery are clean the ale is injured and harmless; and farmers have hence learned by experience the importance of cleanliness in the interior of their houses. From the taste for household cleanliness has been diffused throughout the surrounding population. They have only to order the air which they breathe about their homes in better order, and cleanliness will follow them, the habit of being clean is spreading to the people in the world. To place any of the new farmhouses and cottages to be built on certain elevations is the first point; to carry out and to cover with earth all the refuse of the house and yards daily will prevent the escape of the ammonia, the most precious part of the manure, and at the same time rid the atmosphere of the fatal malarial that surrounds the farmhouses and cottages of the country.—These matters well deserve the attention of English landed proprietors, who largely employ these sanitary matters than their agents, and can at once give effect to improvements beyond the reach of the small proprietors of other countries."

IMPROVEMENTS. The present article is intended to indicate broadly the progress of architectural and other public works of an important character in the metropolis since the publication of the "Penny Cyclopedia," and, though with less particularity, similar progress in provincial towns.

Since that date London has been greatly altered. If there have been no such rapid or extraordinary architectural trans-
formations as in Paris, there has been continuous and steady improvement. New streets have been opened, and obstruc-
tions have been removed. Some streets which are now so-called "villas," have been added to the suburbs on nearly every side. New parks and public places have been formed. The drainage of the vast area which is now included within the metropolitan boundaries, has come to be regarded as a question of general concern, and the plans which the system has been greatly improved, a scheme of metropolitan drainage, of a magnitude unrivalled in the capitals of ancient or modern Europe, by which the entire sewage of London and the suburbs will be carried some miles below the metro-
politan limits before it is discharged into the Thames, only seems to wait for its adoption by the government a decision as to certain subsidiary points on which the representative of the government and the representatives of the London peaceable and extensive plans. London is no longer an open city. Its water has been declared illegal, and numerous convenient conveniences, some of them of great extent, have been formed at a due distance from the City. The water-supply has been in-
cressed and purified; and many other sanitary reforms have been accomplished. New museums and other educational institutions of a national character have been established. A vast legislative palace has been reared; a new Royal Ex-
change, numerous churches and chapels, and many other public buildings of considerable size and costliness, as well as many great commercial works, have been constructed; and street architecture has assumed an entirely new char-
acter and consequence. And in all these matters the larger provinces have continued to compete with the metropolis.

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 easily accomplished had the improvement been carried out as part of a well-considered general plan, instead of being disconnected and local expedients. In the City, however, something like a general plan has been observed. The erection of the new London Bridge led to the formation of a new and important street—Shad Thames. This was due to the necessity of still greater changes; and the civic authorities have since kept that necessity steadily in view. The erec-
tion of the new Royal Exchange afforded an opportunity for opening the area surrounding that building. By the removal of the houses and the streets which were on the north side of St. Paul's, an excellent street—New Cannon Street—has been formed from King William Street to the east side of St. Paul's Churchyard. This street has been for the most part carried through by the Corporation of the City of London; and the name, "New Cannon Street," is a consider-
able architectural pretension: it is greatly to be hoped that the corporation will not allow the fine view of St. Paul's Cathedral opened by New Cannon Street to be obstructed by the erection of a building on the triangular space at present left unoccupied by the present form of the new street. To render New Cannon Street as serviceable 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 appearance and other effects of the City. Another, though less important new line of thoroughfare, is Gresham Street, extending from Lothbury to the Post Office. More recently a wide street has been formed as a continuation northward of Farrington Street. It is called Victoria Street, and extends from the foot of Holborn Hill to Clerkenwell Workhouse. It passes through a very poor neighbourhood, and as yet no buildings have been erected along it.

Beyond the limits of the 'City,' the first place among the new lines of thoroughfare and the most completely formed is that 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's Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the 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 though somewhat awkward and indirect thoroughfare from the Strand by Waterloo Bridge to New Oxford Street and Tottenham Court Road. Cranbourn Street at the west end of Long Acre and New Coventry Street, between Leicester Square and Coventry Street, have in like manner been opened, and the thoroughfare has also been extended, but further improvement is still greatly needed in that quarter. At Westminster a fine line of road has been formed from the Abbey to Pimlico, but the greater part of it remains uncovered with buildings; at present only a few blocks are solid, and a portion of it is on the bank of the river; but the remainder is only a narrow strip, and the buildings are mostly composed of the large mass of houses about Buckingham Gate which formed so great an obstruction to the road-way, and so un-
sightly an appendage to the royal abode, the grounds of which have thus been somewhat extended; and at Chelsea by the large building which now forms the south-west corner of the streets as approaches to the new suspension bridge. At the east-end of London the most important new line of street is one called Commercial Street, extending from Whitechapel.
Commissions who had been appointed to adjudicate, decided in favour of a design by Mr. Charles Barry, R.A., then best known as the architect of the Travellers' and Reform Club-Houses. After much discussion he was instructed to carry out his design. The first portion of the works undertaken was the river wall, which was constructed by means of a coffer dam, under the joint superintendence and direction of the engineer and 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 7th, 1840. From this time buildings, under the direction of Mr. E. M. Barry, (in a paper descriptive of the new palace, read before the Royal Institute of British Architects, Feb. 1, 1856, and of which, as it may be regarded as semi-official, I have made use,) have much altered and modified the portions of the edifices have been completed, and at this moment little remains to be done. The Speaker's House is all but finished, and will be occupied after Easter. The residence in the south wing will be completed in a few months, and before long the house, the royal staircase and the staircases 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, "and I will not attempt to construct..." but when the difficulties of all kinds which have been experienced are duly considered, and it is borne in mind that the public business 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 piecemeal 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 statement, as we quote it from Mr. Barry's work, there may be, as the time has been spent on the building, the extent, character, and complexity of the works, even had there been no extraneous hindrances, would not have been sufficient to make it necessary for him to say that no other building at all approaching it in size, solidly of construction, and richness of external 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, casbah, and domestic styles, and to select that which I consider better suited to the peculiar appropriation of the buildings." The east, or river front, which stretches along the Thames a length of upwards of 1,000 feet, and contains the libraries and committee rooms, was the first portion of the exterior completed. Of this façade 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 height but uninterrupted. The arcades and parts, "reliance being placed," says Mr. Barry, "on breaking up the sky-line to avoid monstrosity." Throughout this front, as indeed with scarcely an exception throughout the building, the wall-surfaces are ornamented with arcades enriched with carving. "The carving between the stories of 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 Wranham I. and ending with William IV. The oriel bays bear the present Royal

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Arms of England, with the motto, "Victoria Regina feliciter regnum.">" Examined 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 effect produced by the light and shadow, or by the play of light and shadow. It is impossible not to regret that, by the adoption of bold breaks in the outline, a more picturesque combination has not been preserved to the reader.

The western front 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 a grand central tower with flanking turrets at the corner of Palace Yard. The great feature of this front is the Victoria Tower, which occupies the south-western extremity of the building. This magnificent structure is 70 feet square, and rises to an altitude of 546 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 32 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 paneling, with canopied niches containing statues of the monarchs of England, and with the arms and supporters of the different sovereigns. A pierced balcony runs the width of the tower, from the angles to a height of 85 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 contemplated from the top of the tower 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 safely be said to be the finest tower of medieval date for beauty and grandeur as well as for mere size. Two other towers form equally interesting features in the design—the Central Tower, less than the Victoria Tower, crowned by a round tower with a light and elegant spire, which rises to a height of upwards of 300 feet, in many points of view grouping 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, it 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 'Houses of Parliament.' These are placed pretty nearly in the midst of the building. In the very centre is 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 Tower. The central hall is covered by an arched gallery on four sides, south lead to the House of Peers, and a similar corridor and 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 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 appearance. The room is about 250 feet long, 32 feet broad, and height 45 feet. It has six windows, filled with 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 the similarly shaped and gilt decorations 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 as the wall panelling, are painted and gilded, the letters of the wall-surface which is not occupied by carved wood or stucco, is decorated with gilding or colour; and in respect of its decoration the room is probably the most elaborate and gaudy of all the apartments in the House, since the decline of medieval architecture. The House of Commons is 250 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 acoustic defects. In character this apartment bears a general resem-

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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 spokesman of his active and lucrative position, to one who had a title to be regarded as the architect 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 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 of the same kind would be undertaken in connexion with the new palace, and whereby some of the edifices, the government having in 1866 offered premiums to the amount of 5000L. to the architects of all nations, without re-tracting them as to style or cost, for a block of buildings which should embody 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 parts of such general scheme,—on for the department of the Secretary of State for Foreign Affairs, the other for the Secretary of State for War." By the specified time 216 designs, embracing nearly 2000 drawings, were sent in, and 17 of them, by French and German as well as by British architects, were exhibited. The answer to 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 allowed that the most successful and the most necessary and best has displayed a very unusual amount of professional 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 declination to provide funds for such a scheme, and could not be a scheme, and without any public intimidation, 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 competitor. But, in the House of Commons, Sir Benjamin Hall as commissioner of public buildings, directed a non-competing 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 flagrant a breach of faith can be justified, 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, and if the public interest require it, then the 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 A. W. N. Pugin. But it is in the article Lowson was written: 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 inapropriate 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 small to accommodate the important collections in view for its purpose. As early as March, 1837, in an article on ‘The New Buildings at the British Museum,’ which appeared in the ‘Mechanics Magazine,’ vol. xxvi. p. 45, the question how best to obtain more room than the new buildings would afford, was discussed, and it was pointed out that ‘the space thus unfortunately 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 is established on each floor of the library, and is central, and is bounded on all four sides by galleries for the 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), goes on to say: ‘but it was decided in due course by which arrangements which this arrangement pos-

sees over Sir Robert Smirke’s arrangements for the library and reading-room in the new building. But as 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, in order to make an extension of the building on the eastern and northern sides, 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 1853, but the rejection of the plan by the Government 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 one occasion by the rejection of the plan in 1837, and was revived in 1853, and finally abandoned in the new Reading Room. Some years later Mr. Hawkins of the antique department in the British Museum proposed to erect a Board-room for the trustees, with studies for the chiefs of the libraries, offices for clerks, 

&c., in the centre of the quadrangle, connecting them by corridors with the galleries of the building itself. Mr. Hosking, 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 mand, 150 feet in diameter, and 100 feet high, ‘to form a grand central hall’ within the quadrangle, containing some 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 the cupola. The whole plan of this magnificent project did not meet the approval of the Trustees. In 1849 Mr. Fergusson 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 very much on the same plan the British Museum buildings, the chief feature of his design being a grand central ball within the inner quadrangle: but neither the voluntary, nor the commanding design was destined to be carried into effect. In 1848 a new principal librarian, then keeper of printed books at the British Museum, was 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 1850 he produced such a more elaborate scheme, and this on the recommendation of the trustees, the government sanctioned. His plan, as put into working form by Mr. Sydney Smirke, was to erect within the inner quadrangle of the museum a Reading Room, circular in plan, and in the centre of a pyramidal cupola, to be covered with lead, and to afford for 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 completed and opened for public use in May 1857. It is constructed principally of iron,—the supports being cast-iron piers, which carry girders of wrought iron strongly tied together, and these bear the dome. Between the main rite 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 method of being lighted, the several openings being fitted with coloured glass, which, with the artificial lighting, the Pantheon being entirely lighted by a circular opening at the top 88 feet in diameter, while the Reading Room has a similar light at the top 40 feet across, and 30 large windows in the base of the dome. Little is seen of the interior, but the interior proportions and general effect are very pleasing, 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, and space is reserved for the accommodation of 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 buildings of the British Museum, by a new façade designed by Mr. Blore. In magnitude it is however greatly inferior to Nash’s façade, bad 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 such friable quality that it called for a great deal of care to cover it with paint. The Marble Arch too, which, however incongruous with the palace, assisted in imparting to it a certain dignity of appearance, has been removed; and now forms the front entrance to Hyde Park.

The Treasury Buildings, Whitehall, have likewise undergone transformation. By some strange misconception the original building, erected in 1833, was so set out by the architect (Sir John Soane) that it could not be completed according to his design, and accordingly not according to Soane’s specifications. About 1845 Mr. Barry received directions to complete it according to a design he had prepared. Soane’s façade was consequently made to give place to one of a much more florid character, which with one of the three, and which is a rich and elegant example of Italianised Corinthian. Chamber’s Somerset House has been as far as possible completed by the erection of a west wing—the construction of a correspondent east wing being rendered impracticable by the erection of King’s College. The west wing of Somerset House has been built in a manner in every respect satisfactory: the architect was Mr. Pinnenthorpe. The same architect has also erected several other buildings for the government. One of the most pleasing of these is the Museum of Practical Geology, Jermyn Street, Piccadilly, which, for its position, its style, and its being, for some occult reason, turned towards the leading thoroughfare, the front towards the narrow bye-street. The building is a neat example of the Venetian palatial style; and the inner court is laid out with great taste, but the exhibition part of the edifice is not remarkably effective or convenient. Mr. Pinnenthorpe is also the architect of the fragment of the General Record Repository, Fetter Lane; of the additions made to the Ordnance Office in Pall Mall; and of the extensive range of offices for the Duchy of Cornwall, erected (1857) in Pimlico. The only other government building which requires notice, and that rather from its extent and massiveness than from its architectural merits—for it is the house of builder’s castellated—is the new building at the Tower.

Of civic buildings the chief is the new Royal Exchange by Mr. William Tite. The old exchange was destroyed by fire on the 10th of January, 1838, but the first stone of the new building was not laid till the 17th of January, 1843; it was opened by the Queen in person on the 28th of October, 1844. As in the old exchange there is an open central area appropriated to merchants (110 feet by 53) which is surrounded by small arcades, and there is a spacious corridor or merchants’ walk. The eastern end is chiefly occupied by banks; and near the centre of the building are some fine apartments—one being 100 feet long and another 80 feet by 40. The principal feature of the exterior is a Corinthian portico, at the west end, of eight columns with two intermediate. The Corinthian portico is 17 feet wide, and the diameter of the columns being 4 feet, their height 41 feet; and the pediment is filled with sculpture by Mr. Westmacott. The other parts of the building display considerable picturesque ness of character, but the southern side has been a good deal marred by the vandalism of the authorities, who have caused the granite pilers to be cut away in order to give a little more room to the windows of the shops with which, from motives of economy, the architect had not provided his plans. No notice of this or any other portion of the building may be noticed here, the Coal Exchange by Mr. Bunning, which was opened with some ceremony by Prince Albert in 1849. Architecturally however it is rather peculiar than beautiful, but it is said to be well arranged; both the Royal Exchange and the Coal Exchange were somewhat freely decorated with arabesques and other designs in fresco by Mr. Sang, but in both the painting has failed to withstand the test of the civic atmosphere.

But the year 1845 was not the general revival of Gothic church architecture. Churches were going up with surprising celerity everywhere beyond the limits of the city proper, but with greatest profuseness in the outskirts. Most of the new churches have occasion to refer to in the article London were Greek or Roman Catholic. Very few new churches belong to the Establishment as a matter of course Gothic, but almost invariably every dissenting place of worship and every Roman Catholic chapel is also in strict conformity with the period’s of pointed architecture. That this has been a great gain cannot well be doubted. Instead of grim caricatures of temples of Jupiter or Venus, or at best Minerva, we have fanes which can only suggest associations of Christian worship—though it may not at first present some. Such an architectural idea seems to serve to diversify the general monotony of our streets, and by their towers and spires to break the formality of what architectures call the ‘sky line.’ But hitherto there has been, as was the case with the so-called Greek churches, by far too many instances of the want of accurate judgment in the attempts to meet mediæval Gothic architects—forced thero 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-tracery, carvings, and other decorative parts, with the familiar saltires and crosses of the ‘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 modelling after the lapse of those 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 there-fore in their picturesque ness of external form, and in the best of them, in the sober ‘religious’ 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 architecture and of a true and generous sense of the growing desire to cast off the merely servile adherence to mediæval precedent: the return, in a word, to the medieval spirit—to earnestness and truth of purpose, and freedom of design in the treatment of the building itself, and to the plainness and we believe will lead to a still greater advance; and if it fail to create for this nineteenth century an architectural character of its own, it will at any rate save it from the condemnation of being purely mimetic. So numerous are the recent London churches that it is difficult to misstate the innumerable, were it even desirable, to particularise them, and it will be sufficient, in order to avoid invidious distinctions, to refer as characteristic examples to the church of St. Stephen, New Church, the church of St. Matthew Sun Street, the expense of Miss Burdett Coutts, to that at Highbury, by Mr. Alom, which is noteworthy for its effective, though not costly interior; and to the very remarkable one of red and black brick by Mr. Butterfield, in Margaret Street, Langham Place, which will when finished be the most perfect illustration in London or its vicinity of the views and anticipations of the ecclesiologists; to Pugin’s Roman Catholic cathedral of St. George, Southwark; to the cathedral of the Catholic and Apostolic church, Gordon-square; to that at Amsterdam by Mr. Binneman; and to that at Deans, 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 in order to make the gesture of a great increase in the various reversed of fortune was finally abandoned by the English drama, and in 1846 the interior was entirely remodelled by Mr. Albano, 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, 1858. 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. Barry with all the requirements of the opera, but with various novel arrangements, which are intended to render it easily available for the regular drama, or for concerts, public meetings, &c. In size the new theatre is about one-fifth larger than its predecessor, being 240 feet long, 133 feet wide, and nearly 100 feet high, which is nearly equal to the dimensions of La Scala at Milan, the largest theatre in Europe. The proscenium is to be 60 feet by 40; the stage will be 90 feet and 60 deep, and 90 feet high, which is nearly equal to a semicircle instead of a square, the latter in size will be 75 feet deep, 65 feet broad, and 80 feet high; and there will be only three tiers of boxes. (The proportions of the old building will be found under Covent Garden). The new theatre has been much more freely used than in any former building of a similar kind. The roof formed of nine immense wrought iron lattice girders, each 90 feet long, 1 foot 6 inches thick, and 9 feet 6 inches deep, and weighing 18,000. The chief feature of the exterior—about which we regret to
see a great deal too muchшимy '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 basii-relici, which were saved at the fire of the old theatre, have a place in the new portico, and his statues of tragedy and comedy are 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 adjacent houses. The upper story was opened in May 1858. A kind of conservatory or "floral arcade," of glass and iron, 340 feet long, 60 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 conservatory for fruit for hothouses.

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 no little admiration if constructed for more aristocratic circles. The first of the former kind, St. Martin's Hall, Long Acre, built primarily for the use of Mr. Hullah's music classes, was first opened in 1850, but only fully completed in 1855. The hall is 100 feet long, 42 feet wide, and 42 feet high; and the smaller supper halls beneath. The architect was Mr. Westmacott. In form and general appearance it has been modelled on the old baronial hall, but though a handsome and well proportioned room, it wears too sombre a character for the interior, and is not so spectable, though far from perfect, and the floor being level, and the stage low, only those of the audience who have front seats can see the singers; moreover, it has the usual lack of sufficient, safe, and ready outlets. The exterior makes no attempt of sound monumentality in part, as it is

has no claim to originality, and the absence of a similar building, in a place of such importance, is a source of regret. The Excise Office, in Broad Street, built by James Gandon in 1768, of which it was remarked in the article London 'Penny Cyclopaedia,' vol. vi. p. 114, "its size is almost as great as 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 made of it, and it was destroyed by fire in 1871. For a building, the chief merit of which is its size, there is 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 are the club-houses, which includes the banking-houses and insurance-offices. To many Paxman's, Parnell and Smith, who have taken for their type the Palazzo Carlo, of the great Venetian, or rather Florentine, architect, have been so original that has been placed on the shady-side of Pall-Mall. Nearly opposite to it is another club-houses copied from Sansovino: the Army and Navy, by Messrs. Nelson and Innes in the Junior United Service Club, Regent Street, a spacious and very stately pile, which replaces a smaller and less assuming one by Sir Robert Smirke.

A few private residences have been built at the west-end during the last few years which may help to maintain the prestige due to the abodes of our nobles and wealthy commouners, somewhat endangered by the palatial splendour of the club-houses. Of these the first and grandest is Bridge-water House, Cleveland Bow, built by Sir Charles Barry, 1845-50, for the late Earl of Eddesmere. In its general character, and in the gracefulness and finish of its details, it reminds the observer of the designer of the Travellers' and Reform Club-Houses, but it is more ornate than either, and retaining its chaste dignity. Its dimensions are 142 feet by 130. It has a noble state dining-room, 48 feet by 25, and a state drawing-room 68 feet by 25; but the great feature of the house is the saloon, 130 by 66 by 110 feet long, and which, were the lighting somewhat more satisfactory, would be in every way worthy of its magnificent contents. Scarcely less palatial in scale or style is Dorchester House, Park Lane, erected in 1839-43 for Mr. S. S. Holford, and the town house of Mr. L. E. Sumner, which is 216 feet by 130. It has a ground floor of Italian 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 105 by 184 feet. The mansion of Mr. H. T. Hope, erected in 1848-49 by Professor Donladson, is in the designs of M. Desland, at a cost of 30,000L, also derives 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 paintings—indeed 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 there still more distinctly manifested than at the west-end, though at the west-end the improvement has not been inconsiderable. In the new streets have sprung up a long row of neat houses, and a succession of handsome buildings, unprecedented 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 buildings is the introduction of large windows 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 magnitudes have been built, or are building, in every part of the city which lies within the business boundaries, in the narrow alley courts, and lanes, as well as in the main lines of traffic. The most remarkable of these blocks of offices for extent is which are to be seen in the City, and the feeling of regret; for to make room for it one of the most artistic edifices in the city was pulled down. This was the Excise Office in Broad Street, built by James Gandon in 1768, of which it was remarked in the article London 'Penny Cyclopaedia,' vol. vi. p. 114, "its size and 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 made of it, and it was destroyed by fire in 1871. For a building, the chief merit of which is its size, there is 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 are the club-houses, which includes the banking-houses and insurance-offices. To the former several have been added by the joint-stock companies, as the Bank of London and the City Bank, which stand nearby.

To our former list of club-houses we have now to add some of a still more costly character. First of these in point of time was the Conservative, in St. James's Street, a stately edifice of the Roman style, erected for Sir Robert Smirke, by Mr. G. Basi and Sydney Smirke. The front of the old Carlton, by Sir Robert Smirke, has been made to give place to a 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 pretence; and among them must now be placed the South-Sea House, which was converted to the use of another company of as bad eminence as the corporation for which it was originally built—the British Royal Bank. Among private establishments may be named that of Jones, Loyd, and Co., in Lothbury, whose new office, by Sir John Soane, stands as tall and fine as anything in the money market. In connection with these the architect who has, in the streets of a city such as London, and shopkeepers in such a city must endeavour 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 intended as the most palpable fault in the shops 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 pretence. The Arcade, a long and low building on the south side of Fleet Street, where the whole upper part of the house rests on a heavy carved cornice, and this, with all that it carries, on two immense sheets of plate-glass. Yet, if possible, the absurdity has been rendered even more palpable by the addition of a second floor, formed 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 supporting pillars at the end are hardly larger. Of course in all these cases the upper parts of the building are really supported on wrought-iron girder, and for bearing these sufficient provision is made by strengthening the side walls, and by adding piers, &c., where necessary. Now, in this case, in the first place, the eye is given 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 destroy the effect of by some gaudy decorative additions—why not accept the necessities of the case, and endeavour honestly to surround them? Railway and other recent engineering works have too much accustomed the eye to the weight of structure, and the absence of columns where it is visible to be adequately upheld. If the strength of the structure be satisfactory, there will be no doubt—none of the latent doubt even which unconsciously produces the feeling of distrust in the uninstructed observer—of the sufficient support and the sufficient pretence of the building. What seems to be wanted, then, is to frankly admit and not to endeavour to conceal the girders, and to give to the supports the greatest possible emphasis. Then trampled, equally with circular or pointed arches, architecture will be found to satisfy the eye 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, be adapted. To carry on the great subject of building as the basis of the history of the art, and to seek for the Artistic aspect of a subject in which the service which may be rendered by composition as an adjacent to well-executed brickwork in London street architecture, when it is used as composition and not as a deceptive imitation of stone. Before leaving the City we may just mention that two of the best known of its buildings have been considerably altered: the Bank of England both externally and in the interior, under the direction of Mr. Cockerell, who, as regards the outside, has, without changing any of the better parts of Soane's design, by giving elevation in certain portions of the
façades certainly improved its general character; and Newgate prison, of which the whole interior has been rebuilt on very superior plan, while the exterior—a classic example of prison architecture in general estimation—has with excellent success been 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, Giltspur-street Comptoir, has boon in some respects more convenient and attractive, and which, when the new city prison at Holloway was completed, this site is still unoccupied, as 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 enormous cost, which was so very impregnable and of so much importance that the city of London Orphans' at Brixton, the City Industrial Schools, at Peuge, the South Metropolitan Industrial Schools, at Sutton, Surrey, the Whitechapel Industrial Schools at Forest Gate, Essex, and much less, was above 150,000. Scarcely so much can perhaps be said of the Great Western terminus, as it is rather remarkable as an engineering than an architectural work, but it has the great merit of showing adaptation to its purpose in a very unusual 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 an hotel built for the railway Company by Mr. Hardwick, which, in size, architecture, and comfort, surpasses any yet constructed in London. The style—late French renaissance, with its bold masonic roots to the centre and turrets, the colossal terminal figures supporting the facade, &c. and with the spaciousness and interior artistic character a feature which has excited much notice. The terminus of the Great Northern 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 is a most attractive and spacious interior. The Great 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 South Metropolitan, whose walls and warehouses are already a quarter-mile long, the London Docks at Shadwell, to make 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 increased room for general purposes. With this new basins of great depth have been formed, a new entrance constructed, with gates of enormous size, and other improvements of great power, as well as new warehouses and other works. At the Commercial Docks, on the Surrey side of the Thames, extensive alterations and improvements have been carried out. On the Pissow Marshes, just below Blackwall, a new construction has been made, with a basin of great area, and the new docks have been expressly designed to afford at present about 90 acres of water area, with entrances admitting large vessels than any of the old docks, though not, we believe, larger than the new works at the London docks in Maryland. At Woolwich a new dock of enormous size 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 Bremford 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 London. Great has been the protracted struggle, the city corporation were compelled, in 1852, to remove their fondly cherished Smithfield market; but it is due to them to say, that when compelled to provide a new cattle market in the suburb instead of in the centre of the city, they succeeded. A great deal of money has been expended on 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 100 acres, but a new cottage house accommodation, with provision for 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 not without many other architectural and utilitarian advantages—banking-houses, and some 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 of the Metropolitan Cattle Market, with all 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 style of neatness and grace, charmingly appropriate.

In 1852 an Act was passed 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 Vauxhall, 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 450,000. 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 outskirts of London; 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 already begun upon the Thames, which, in works near the head of their river (including the drainage and diversion of the sewage of the town of Hertford), in forming capacious new reservoirs, and covering their old ones, &c., have 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 an improvement in the quality of the water supplied to the inhabitants of London. The Registrar-General, in his Report on the Health of London for the year ending April 18, 1855, 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 the water of the Chelsea 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 course, was always purer than that of the former. Still it is very questionable whether small quantities of extraneous matter when so great a quantity of water has been used 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, Chertsey, Staines, and other towns, and, as Mr. Ranger, the Superintending Inspector of the General Board of Health, has pointed out in his Report on the Sewerage, &c., of Aldermaston village, the new sewage of works of the city at Aldermaston have been so constructed as to have "their outfall into the Blackwater river . . . one of the tributaries of the Thames, entering the latter above the point from which a very large portion of the London supply is now taken, and thus a new source of pollution" has been introduced. In fact, it is stated in a Report just laid before the House of Commons by the Royal Commission appointed expressly to inquire into the best mode of distributing the sewage of towns that "the Thames, before it reaches works of the city at Aldermaston and a part of London is at present derived, receives the refuse of districts containing upwards of 700,000 persons." Under the circumstances, it would therefore be consolatory to believe, with Mr. Ives, "that the commission and armoury employed by the Metropolitan Board of Works to report on the Main Drainage of the Metropolis,—that this is of comparatively little consequence, Thames water being, in fact, a new disinfectant; "sewage matter, they say, "being poured into a much larger volume of fresh or fresherened water, becomes immediately oxygenised, and ceases to exist as a noxious and offensive agent."

Of the rival plans for intercepting the main drainage of the metropolis, as they are yet only plans, we shall not give a detailed description. It will be sufficient to say that the government referees and the engineers of the Metropolitan Board of Works were directed to proceed upon the basis, that a vast intercepting sewer extending on each side of the Thames was agreed upon, and that the question was to settle the distance from these metropolis boundaries to which it should be carried, the whole question has been re-opened by the Royal Commission mentioned above, who have just laid before the House of Commons (April, 1856), the outline of plans for an intercepting sewer reaching at once the embankment scheme of the Metropolitan Improvement Commissioners of 1844. The embankments they propose to be made to contribute to the beauty as well as utility of the river, the relief of the over-crowded streets by means of advanced terraces which are to afford connecting lines between London and Westminster, and the connection of railways on the southern side of the river; while the sewage is to be received into reservoirs in the embankments at the mouths of the existing main sewers. But it has been there deodorised and purified, the liquid part is to be permitted to flow into the river, and the precipitated matter to be carried away for agricultural purposes or discharged into the sea. Of the desirability of such an embankment, as they term it, they say it is "the most important part of the scheme is more questionable; but the Commissioners are sanguine as to its practicability, and they assert that the reservoirs and apparatus would be hidden beneath the surface, and that no matter whatever is dropped into them they estimate at 3,250,000, which is some 500,000 less than the intercepting sewer scheme of the Metropolitan Board, and 2,200,000 less than that of the Government referees is estimated to cost. But this reminds us that among the Metropolitan Board's improvements we have not mentioned the embankment of the Thames between Pilimico and Cheaps, a very excellent work, and thoroughly well executed, but which, estimated at 62,000, has cost 112,000.

Among new water sanitary improvements in London we must not pass unnoticed the substitution of spacious suburban or more distant cemeteries for the crowded churchyards of the city. Of new cemeteries the most remarkable is the London Necropolis, or Woking Cemetery, formed by a private company, which under powers of an Act of Parliament purchased 2100 acres of forest heath land, extending upwards of four miles along the line of the South-Western Railway, towards Farmborough and Pirbright. Of this land the company have constructed a vast number of a slightly undulating heathy tract, singularly quiet and picturesque in character, as a cemetery, and built chapels for the use of the members of the establishment and nonconformists, who, in consequence, have been numerous; and they are also provided for the exclusive use of the cemetery, in London, and special trains carry the funeral direct from it into the cemetery—a short line of railway having been constructed for the purpose. Funerals are thus conducted with economy, privacy, a careful regard to the feelings of mourners, and in all respects with singular propriety. As near to the best mode of interment as in the present state of society is perhaps practicable, appears indeed to have been attained. In connection with no other cemetery, we believe, has there been made such judicious arrangements for the conveyance of funerals from London—a matter of great consequence where the cemetery is at some distance from the city, and one which, like some other sanitary improvements, presses with peculiar severity on the poor. A very extensive and well-arranged cemetery has been formed by the City of London at Ilford, Essex; Marylebone and St. Pancras parishes have constructed theirs at Finchley; Lambeth parish has one at Tooting, and others newly formed are to be seen on every hand. Necropolis and cemetery towns have been devised and are springing up.

Turning to the Provinces, we can do little more than repeat our former statement, that great as has been the progress in architecture and public improvements generally there has been nothing of like importance to the provinces as the propitium made equal or nearly equal progress. We can only venture in vindication of this statement to refer briefly to a few particular instances. At Liverpool this has been eminently the case. St. George's Hall, designed by Mr. H. L. Eimers, but, in consequence of his death, completed by his
Cockrell, 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 Romano-Corinthian edifice in the kingdom. The hall itself, 168 feet long, 100 feet wide, and 80 feet high, and over 200 feet in circumference, is a healthful guardroom for a party 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 greatest architectural works of the day. But the Corporation of the Collegiate 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. Cockrell, &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 number and extent, at an outlay of several 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 1845, cost £150,000; but another, at Berry Street, cost £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 overrated, and its population is rapidly increasing. Foremost, as forming a sort of central point of the city, is the Exchange; which as lately enlarged affords the most spacious room, we believe, in Europe, for the meeting of commercial men, and both externally and in the inside is a very admirable work of its class. Free Trade Hall (by Mr. Walters), is in its title as well as its purpose, a structure characteristic of Manchester, and moreover a very fine building. Other buildings of a semi-public character are the Theatre Royal, over which Mr. John Pink, the bank of Messrs. Haywood; the Manchester and Salford Free Library; churches, chapels, synagogues, &c. But indisputably the warehouses form the distinctive feature of Manchester in an architectural point of view. They are very numerous and of increasing size. There are for the most part of great size—one, but we believe it is the largest in Manchester, built for Sir James Watt, the late mayor, by Messrs. Travis, is of the enormous dimensions of 300 feet long, 90 feet deep, and 100 feet high, three of the fronts being wholly of stone. And these warehouses are constructed in the most substantial manner, of stone or of excellent brickwork, with stone quoins and dressings: 'compot' is not in repute in Manchester. The style usually adopted by the merchants of the city, is called the 'simplified Romanesque,' which is in most instances carried out (as for example in those designed by Mr. Walters) with great refinement and finish, the carving and details being often worthy of a London club-house. The bulk of the London warehouses would certainly stand in no way with many of their Manchester prototype. A good beginning has likewise been made towards the embellishment of the city and suburbs with public monuments and parks. The front of the infirmary has been laid out as a hospital, and the entrances to the new buildings of Wellington, Peel, John Dalton, and James Watt, have been erected. New streets have been opened in the city, and old streets have been widened. The drainage has been greatly improved; and an ample supply of water has been brought from a spring-fed reservoir on the outskirts of the town. And outside the city three new parks have been formed: two of which, Queen's Park, Harpurhey, and Peel Park, Salford, are very attractive resorts.

Birmingham has hardly kept pace with the two great towns of Lancashire: yet it has added some new buildings worthy to rank with its noble town hall; as for example the grammar school, the new hall, the music hall, the midland institute now in progress, and some others. It has also its park; but we cannot add that it has had a government house. The Victoria Rooms have been done. The Victoria rooms is a spacious and very noble building for musical festivals and public meetings. The guildhall has a façade which is rather a favourable example of the Tudor period, but the interior is ill-arranged and undignified. The St. Paul's Church is one of the most recent additions to the architecture of the old city, and both are more than ordinarily ambitious in design. Turning from our manufacturing and commercial to our university towns, we find no falling off, though the architectural seal has taken a different direction. At Oxford the handsome range of buildings by Mr. Cockrell, called the Taylor Institute and University Galleries may be taken as marking the close of the passion for classic art in that university. Oxford is now, and has been for some years, the head quarters of mediævalism, and there the ('ecclesiologists') hold unquestioned sway. Perhaps nowhere else can the good and the evil of the Gothic revival be more distinctly seen. For years past the grand old city seems to have been raised up to the gothic builder and the gothic restorer. It would be idle to attempt an enumeration of the works which have been accomplished. Almost every college has added a new front, and often a new chapel, or has made only a little addition to its existing architectural treasures, or 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, and one is constantly struck by the promptings of a zealous love of Gothic architecture, a love with which 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 worthy to stand beside the glorious buildings which surround them. But we cannot afford no such liberal praise for the so-called 'restorations.' They may have been well done professionally: they may have been correctly performed according to ecclesiological 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 beading frame of age. They now consequently exhibit neither the solemn majesty of the old, nor the lightness and beauty of the other. Our ancient Gothic structures—marvellous in the grandeur of their forms, in the evidences of mental power and artistic fancy, in their quaint carvings and playful details, in their beauty of composition, on which the cultivated and the uninstructed alike gaze with 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 glorious medieval art as no longer worth the labors of our own artistic imaginations; 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 folly to spend time over the rude 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 love of antiquity was restored to the scholars of modern Europe. Such foolish fondness have sought to replace the decaying vestige in which the object of our affection was clothed, by one as exactly resembling it as we could contrive to fabricate, forgetting, till too late, that the new and gay drapery is after all but a modern fiction, and that the true adornment which we have replaced was the only true one—that we have indeed copied, but in copying have destroyed it. 'Restoration' in truth is for the most part a mistake. Ancient buildings are not to be restored, but only preserved. To rescue ancient statues—where jealous care from the chisel of the modern artist. If anything can be done to arrest their decay, well: but it must be done so as not to remove, if possible, a hair or a finger-sail of the original—assuredly not to substitute for it anything so artificial as a pasteboard. We ask the reader what the chipped and battered fragment we have removed was in its pristine condition. As well might the Theseus or Ilyssus in the British Museum be submitted to the 'restoring'
chiel of Westminster or Bagby, or any other living Phidias, as our cathedrals and colleges be subjected to the tender mercies of modern representatives of the ancient builders. We are not, of course, objecting to necessary repairs, or even, where imperative, to rebuilding; but simply to the destructive process which takes place in the caricature of ancient work (usually the carved details and secondary features which are the characteristic signatures as it were of the old artists), and replacing them by new work intended to represent (and therefore to form a deceptions imitation of) the old.

Cambridge has proceeded somewhat more slowly of late than the sister university with its medieval reproductions and restorations, but it too has made a real architectural advance. So when the present century Wilkin raised amidst the plaudits of 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 lately erected in every part of the country as the best evidence of the reality and extent of architectual progress. In ecclesiastical edifices the progress has been something wonderful. During the last twenty years churches have been built in almost every part of the country, and a very large proportion of our ancient cathedrals and parish churches have been repaired, or as it is termed 'restored.' As in London, so through the country, all the recent churches have been in the English style, and it is difficult to say which is the greatest work of the age. The most prominent, if not the most original, is the new church at the Church Missionary College, St. Augustine's, Canterbury, built by the munificence of Mr. Hope, and which is so admirable a specimen of the abilities of Mr. Butterfield; and the numerous proprietary and other churches of various descriptions in the towns, such as Trinity, Scott; at Cheltenham, by Mr. Wilson; St. John's, Hurstperpoint, Sussex, by Mr. Carpenter; at Cuddesdon, near Oxford, by Mr. Street; the Lansdowne College, Bath, by Mr. Wilson; the Wellington, at Sandhurst, &c.; theological institutions belonging to the Independent body: at Winchester by Mr. Scott; at Cheltenham, by Mr. Irwin; New College, St. John's Wood, by Mr. Emmett; and at Spring Hill, near Birmingham, by Mr. James—all spacious and handsome edifices in the Tudor style and the perpendicular. A similar in purpose and similar in architectural style of the Wesleyan Methodists, at Richmond, Surrey, by Mr. Trimen; at Taunton, by Mr. Wilson; and the school at Kingswood, near Bath, by the same architect.

Of institutions the town and city churches the number has been surprisingly large. We might mention new Town Halls, at Leeds (a work of a high order of merit by Mr. Brodrick); at Colchester (Doric, by Blore and Raphael); at Ballymena (Doric, by Mr. Jones); at Whittlesby (by Mr. Rowe); at Alfreton (by Mr. Wilson); at East, Suffolk (by Mr. Lamb); at Chatham, at Halifax, at Leamington, Stockton, Bilston, Chertsey, Louth, and very many other towns: Market-places at Bolton, Wolverhampton, Stockport, Swindon, Worcester, at Leeds (a very fine one, costing 14,000l.), at Ashby-de-la-Zouch, at West Hartlepool, and elsewhere; Corn Exchanges, on some of which a large amount of money has been expended—at Colchester (by Raphael and Brandon); at Wolverhampton (by Mr. G. H. Atkinson); at Cheadle (by Pettington); at Southport, at Grantham, at Hitchin, at Louth (a handsome Venetian pile, by Mr. Bellamy); at Banbury, at Hemel Hempstead, at St. Albans, at Grimsby (Elizabelland, by Bellamy and Hardy); at Gloucester (a large and ambitious Romanesque edifice, by Medland and Maberly); at Alcester (Italian, by Mr. Holmes), &c.; Assize Courts at Reading (by Mr. Clary); at Taunton, at Swansea, &c.; County Courts, Post-Offices, &c.; Industrial Halls (some of the very recent ones, like that at Bradford, are of the most extraordinary and elaborate character); Scientific and Technical Colleges (of which there are a number in the large towns); Botanic Gardens, &c.; in this age of great public employments, works; Lyceums, Mechanicas Institutes, Free Libraries, Baths, &c.

Beyond the limits of the towns among the largest and most costly, and from their site and character often the most remarkable modern buildings, are the County Lunatic Asylums, but it must suffice to refer to them thus generally. The County and Borough jails are often curiously enough works of an inexcusably ambitious architectural character; the Royal Naval and Military Colleges; the Houses of the Corporation; the Protestant and Catholic Roman Catholic, must likewise be named in this connection.

Of industrial establishments of a more pleasing order—those of a more useful character—such as the Northern Gas Company's works; the extraordinary manufacturing village of Mr. Titus Salt's at Saltaire, near Bradford, and other great manufactories of recent erection—were 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
the country. But we must pass them by, as we must also pass by
the works of públic companies, at Plymouth, Portsmouth, Chatham, Su-
derland, Great Grimsby, Cardiff, and elsewhere, vast as they
are in extent, and costly but most important in character;
and the equally magnificent works which have been in pro-
gress, both for the inshore and faro-reaching navies. Such
mariners harbours of refuge from the perils which beset
them. The defensive works which are erecting on the
more vulnerable parts of our coast, and for affording addi-
tional protection to our naval ports and arsenals, hardly
people the title of 'defensive ', as such has been so ill
improved. 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, Netley, Chatham, &c.; and although we have
heard much of deficient barrack accommodation, even that
must be largely increasing, and ought to be rapidly improving
when we see by parliamentary returns that in a single year,
1866-7, upwards of a million sterling has been spent in
building and improving hospitals and barrack accommoda-
tions 608,996l. repairs 292,745l. 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
House at Carlton House, London, and the Prince of Wales
Improvements. Through some length, we have yet but very inade-
quately 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 propor-
tional to that of the sister country; yet when we look at the
national buildings which have been erected in Edinburgh
and Glasgow, the unirailled 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 Scotland and Ireland, as well as England, have
made a great stride in the path of architectural progress
during the past twenty years.
PUBLIC LIBRARIES. [LIBRARIES, PUBLIC, S.]
PUFPlNS. [PETREIA].
PUGIN, AUGUSTUS, an eminent architectural draftsmen,
wax 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 in various parts of the kingdom as an
architectural drawings for engraving; one of the most impor-
tant of his earlier works being the buildings in Ackerman's
'Microcosm of London,' 1808-11. He also made the draw-
ings for this great work, 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 vota.
folio and 4to, containing 1,4 plates, with descriptions, chiefly
by M. 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
1828, 'The Survey of the Cathedral and Colleges of England and
France.' In 1832 Mr. Pugin made the drawings for a work entitled 'Paris and its
Environs displayed,' and in 1831 he prepared, with the
assistance of his son, 'Gothic Ornaments, selected from various
instances in England and France.' He died December
19th, 1832.
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
the useful and practical information necessary to assist in
collecting materials in Normandy and England for his
works on Gothic architecture. [Pugin, A.] His first dis-
tinct employment was as assistant to Messrs. Gieves, in
painting the architectural scenery in her Majesty's and Covent
Garden theatres. In 1838 he designed for Mr. Pugin the
architecture in Windsor Castle, and designs for plate in the medie-
val style for Messrs. Randell and Bridge. In 1833 he removed to
Ramsgate, and commenced preparing for publication a
series of ' works illustrative of the furniture and ornamental
work of the Gothic period, in the Nones for 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 Chimneys, with their
Ancient' Timber Houses, 'all of which met with a ready sale, and
undertook not a little to stimulate the growing taste for Gothic
forms. His next work was one that, by its caustic and irri-
tivating way of setting forth some home-truths, aroused not a
little the profession. In 1839 he published 'The Noble
Edifices of the 14th and 15th centuries, and similar
buildings of the present decay of Taste;' a second and im-
proved 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
aun, Mrs. Welby, he built himself a fanciful residence in
the neighbourhood of Salisbury, and removed there, resolved
to devote himself to the study and practice of the true
architecture of the middle ages. Having found in the Earl of
Shrewsbury a warm patron, Mr. Pugin soon obtained oppor-
tunities of exerting his abilities; and during the few years
he lived, he may be said to have raised the profession he was called upon to erect a large number of Roman Catholic churches,
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, which
appeared in the 'Builder' shortly after Pugin's death):—
- The cathedral church at St. Marie at Derby, one of his earlier and
most pleasing works; St. Chad's, Birmingham; three
chambers at the Red Lion Inn, Coventry; the University
and convent at Edge Hill; churches at Oxford, Cambridge,
Reading, Kenilworth, Stockton-on-Tees, Newcastle-upon-
Tyne, Preston, Keighley, Rugby, Northampton, Stoke-upon-
Trent, Bromwood, Woolwich, Hammersmith, Fulham, Ponte-
fract, St. Edward's near Ware, Buckingham, and St. Wilfred
near Alton; a church, and a convent and chapel, at Notting-
ham; convents of the Sisters of Mercy at London, Birmingham,
and Liverpool; a priory at Downside near Bath;
- the churches of the Roman Catholic clergy, and
monasteries, with schools and priests' houses attached;
at St. George's (Southwark), Kinnerly, and Enniscoe. To
these must be added the extensive and costly works executed
in the church at Liverpool, the church at Dublin, the
convents, besides the alterations made in the mansion, of a
church house, and monastery at Alton Towers; and a church
at Cheadle, 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 a
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 super-
intending the ornamentation of the New Palace of West-
minster, which probably owes its somewhat extravagantly
original character and expense to the influence of the Parlia-
mencey. But, besides the practice of his profession, he found
time to add to its literature a second and revised edition of his
'Contrastes'; a treatise on the 'True Principles of Pointed
or Christian Architecture, 1841; 'An Apology for the
Re-
vival of Christian Architecture,' 1843; 'A Glossary of Ecclesi-
siastical Ornament,' 1844; a treatise on 'Floriated Ornaments,'
1849; and 'A Treatise on Chancel Screens,' 1861. We
ought also to add that he was connected commercially with the
house of Mr. James Burton, of Tunbridge Wells, in the
eclesiastical brass-work from his designs; and he is said to
have filled up 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
adverted 'as he stood on the cliffs of Dover, for many
minutes, the 'sailing into 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 unfettered his notions of architectural propriety. Here he expended all his property in erecting for himself a house, a church, schools, &c., the last of which was dedicated to St. Augustine. As he conceived in life his religious feelings took more and more entire possession of him. He now (1856) wrote and published 'An Address to the Inhabitants of Ramsgate,' 'An Earnest Appeal for the Revival of the Ancient Plain Song,' 'The Present State of the Church of England,' Catholics, and other pamphlets of a religious character. At length, overtasked with all this excessive labour and excitement, 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 Ramsgate; 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 extraordinary industry and energy, and he possessed a very unusual amount of knowledge and great ability. He attempted too many things, and he worked too much and too fast to produce 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 stated it in his 'True Principles of Pointed or Gothic Architecture,' 'We may indeed improve in mechanical contrivance and edifice its construction—we may even increase its scale or grandeur; but we can never successfully deviate one tittle from the spirit and principles of Gothic architecture. We must rest content to follow, not to lead. We must indeed widen the road which our Catholic fathers formed, but we can never 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 principles, few of 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 practice of professors of architecture, 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 pernicious 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 congregations are changed. In Pugin it was consistent: in his Protestant disciples it is absurd.

PUMA. [Look.]

PUNISHMENTS. [OFFENCES AND PUNISHMENTS, S. 2.]

PUNJAB, or PANJAB. [HINDUSTAN.]

PURTIE, JOHN, of the East India Company.

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 Caselh. In December, 1834, he was elected for Berkshire, for which he had been a unsuccessful candidate previously; and he continued to represent that county until the dissolution in 1832. 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 investigation 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 agriculturist, and as one who had given his attention to, and carefully watched and tested, every scientific improvement which had been introduced from time to time into the system of draining, 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 to the influence of his 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.

PYÆMIA. [Phæto, Practice of (Blood, Diseases of), S. 2.]

PYREN. [Chemistry, S. 1.]

PYROSKLERITE. [Mineralogy, S. 1.]

PYRRHITE. [Mineralogy, S. 1.]

QUAGGA. [Horns.]

QUASSIN. [Chemistry, S. 1.]

QUATREMÈRE DE QUINCY, ANTOINE CHRYSTOS-TOME, a celebrated French archæologist, was born at Paris, October 28, 1758. Before the outbreak of the first revolution he had made himself known by his researches on ancient art; a memoir on Egyptian architecture was crowned by the Academy in 1785, and in 1786 he commenced his 'Dictionnaire d'Architecture,' which he did not complete till more than forty years later (1829). In 1790 he published 'Considerations sur l'art du Dessin en France.' But his political opinions having led to his election as a member of the Legislative Assembly in 1790, he at once took his place among the party known as constitutional monarchists. He in 1791 became obnoxious to the revolutionists, and during the Reign of Terror was thrown into prison, where he remained thirteen months. On his release he appears to have continued to act with those who were opposed to the new order of things. In the affair of the 13th Vendémiaire (Octoer 5, 1795), he took part in the Convention, and was in consequence tried 'par contumace' and condemned to death; but he managed to secrete himself. When power had fallen into new hands he again emerged, and was in 1797 elected to the council of the Five Hundred for the department of the Seine. But true to his royalist principles, he set himself in opposition to the Directory, and in consequence was one of the first on the list of the 19th Fructidor (9th September 1797) of those condemned without trial to deportation to Cayenne; but he was again fortunate enough to make his escape. After Bonaparte had secured his position, M. Quatremère de Quincy was permitted to return to Paris, though the object of an official imprisonment; but he appears to have thought it most prudent to quietly proseque his literary and artistic studies. On the Bourbon restoration his sufferings for monarchy were amply recompensed. He was named in 1814 by Louis XVIII., Intendant-Général des Arts et des Monuments Publiques, Censeur Royal, and Membre du Conseil d'Instruction. In the following year he became a Member of the Institute, and was appointed perpetual secretary of the Académie des Beaux Arts. At one time he seemed disposed to renew his political life, procuring himself in 1820 to be elected member for the department of the Seine, but he retired to his literary pursuits at the close of the session of 1828. He survived till near the end of 1849, but he had for some years outlived his faculties.

From the restoration, partly on account of his position as director-general of public monuments and secretary of the Academy, and partly from his great literary activity, M.
Quatremer de Quincy occupied a prominent and influential place among the French writers on the history and theory of art. He outlawed 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 he furnishes of the subject he has much in common with the other writers of the day. Yet his work contains much valuable matter, and his speculations are mostly interesting, however unsatisfactory. The following, in addition to those already named, are his principal works:—"Lettres Adressees a M. Canova sur les Marbres d'Egitu," 1822; "De la Nature, du But, et des Moyens de l'Imitation dans les Beaux Arts," 1823—"the most original and the most satisfactory of his speculative works;" "Lives of Raffaello (1824), of the Most Celebrated Architects (1850), of Canova (1854), and of Michel Angelo (1830);" "Memoires et Observations sur les Antiques Restaurés d'après les Descriptions des Ecrivains Grécs et Latins," 2 tomos, 4to, Paris, 1826-29; "Sur la Statue antique de Venus découverte dans l'Isle de Miro en 1830;" and "Essai sur l'Ideal," 1837. He also wrote several pamphlets, discourses, and papers, as well as a great many dissertations in the "Magasin Encyclopédique" of Millin, and various lives in the "Biographie Universelle," besides numerous "éloges" read by him at the Academy: of these last he published a selection, of eight, called "Mémoires de deux grands philosophes," 1827; and "Recueil de Notices Historiques lues dans les Séances Publiques de l'Académie Royale des Beaux-Arts à l'Institut," 1827.


Lozza Chincha Bark, gray compact
\[ H. et B. \]

Lozza Chincha Bark, brown compact
\[ (Dunkele Ten China, Germ.—China pseudo-Loza, Bergen) \]

Lozza Chincha Bark, red chestnut.

Light Calisaya

Lozza Chincha Bark, red fibrous of the King of Spain. (Quina Es- topoasa, Pav. in collect., Lamb. Mus. Brit.)

Lozza Chincha Bark, yellow fibrous

§ 2. Lima or Huanuco Chincha Banks. (Silver Bark, Gray Bark, Engl.—China-Huanuco, Graue China, Germ.)

Lima Chincha Bark, gray-brown.
\[ (Cascara Provinciana, Peruv.) \]

Lima Chincha Bark, gray ordinary

Lima Chincha Bark, white.

Lima Chincha Bark, very rugged, resembling the Calisaya Bark.
\[ (Cascara Negriìa, Peruvi. (Cáscar- \[ cala Lagartijada, Lauber) \]

Chincha Bark, red of Jass or of Loza

§ 2. Red Chincha Banks.

Red Chincha Bark, becoming white in the air.

Red Chincha Bark of Lima.

Red Chincha Bark true, non-verrucous
\[ (Cascara Roja Verdadera Lauber) \]

Red Chincha Bark, official.

Red Chincha Bark true, verrucous

Orange-Red Chincha Bark, verrucous.

Pale-red Chincha Bark, with a white surface.

Brown Cartaghena Bark.

Red Cartaghena Bark.

 Lesbian Chincha Bark of the King of Spain (Cascara Arruaria del Rey, Lauber).

Calisaya Chincha Bark, or Royal Yellow Bark (Königs China, Germ.—Yellow Bark, Engl.—China Regia, Bergen).

Orange Yellow Chincha Bark; Cinammon Bark (Quin- \[ quina—Cannelle), Light Calisaya (Cascara Clara-Amarilla, Lamb.) \]

Pitaya Chincha Bark, Light Calisaya

Pitaya Chincha Bark; Cinammon Bark (Quin- \[ quina—Cannelle), Light Calisaya (Cascara Clara-Amarilla, Lamb.) \]

H. et B.

Calisaya Bark, Wedd.

Woody Cartaghena Bark.

Orange Chincha Bark of Mutis (Spongy Cartaghena Bark; New Spurious Yellow Bark, Pereira).

§ 3. Huamallae Chincha Banks. (Rusty Bark, Engl.—China Huamalleas, Braune China, Germ.)

Huamalleas Chincha Bark, doll gray
\[ H. et B. \]
C. calisaya, and their extremities are invariably attached one to the other, their ends being by this means more elongated.

3. If we study with equal attention the bark of C. pubescens, which is a fibrous ill-defined structure. The external surface somewhat resembles the preceding bark, with the exception of a slight whitish marbling, formed by the continuity of the peridermis, and scirruses which may result from desiccation. The internal surface, as it is usually seen in the cross sections, but a transverse section shows us that it is principally composed of cellular tissue, in which the fibres form but a small number of irregular and concentric series in the interior half of the bark; and that which draws the attention at the first glance is the size of the fibre cell, 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 peridermis, because it is in this state that they are now usually met with in commerce. If perchance they were again to be used with their peridermis and to export them in the same state, it would afford additional means whereby to distinguish them, but would not in any way affect those which we have just treated; for nothing would be easier than to remove the peridermis and to export the net surface and to export it so. As a result, the structure of all the Cinchonas bears more or less resemblance 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 Cinchonas. The purpose however now is not to distinguish these peculiarities, has been to facilitate the comprehension of a very important fact in the diagnostics of the different kinds of Cinchonas; that of the vast difference they present in their mode of fracture. However singular it may be, 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 chemical composition of the bark and the nature of the fracture, 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 liver 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 in it the greatest quantities are precisely those which would most resemble this bark; for instance, those in which the peridermis is reduced to a single layer by the successive exfoliation of the outer tunic, or at least by their adhesion to the peridermis, experience other hand, 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 quinine, and that many old barks which have retained the cellular coating they had when young, yield a proportionately larger quantity of cinchonine; from which circumstance we may conclude that quinine is contained in the liver, or, more correctly speaking, in the cellular tissue interposed between the fibres of the other, 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 fibrous tissue—a fact which is easily determined with reference to the bark, which the external layers of the derm are more stumpy than the internal layers." ("Pharmaceutical Journal," vol. ix.)

The following are the specific characters of the Cinchona calisaya:—Leaves oblong or lanceolate, obovate, obtuse, swollen, often spiny, rarely acuminate, sparsely pubescent, or pubescent beneath; scrobiculate in the axils of the veins; filaments usually shorter than one half the length of the anthers; capsule ovate, scarcely equal in length to the style, which is shortly stigmatic at the base. Seeds frequently fringed, sometimes centriculated at the margin. Of this there are two varieties:—

C. C. vera. A tree with obtuse oblong-ovate or oblanceolate leaves.

C. C. americana. A shrub with somewhat acute-oblong-lanceolate or ovate-lanceolate leaves.

Both varieties are natives of Bolivia and Southern Perú. ("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 Este- meduarda family 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 (now the immortal docteur), and became a representative of liberal ideas in Spain. Quintana was from the first distin-
guished for his spirit of manliness and independence, and when he commenced his career as an advocate at Madrid, home, at the age of twenty, his friends assembled every evening, because he was an ordinary resort of those who were opposed to the degrading policy of Godoy, the all-powerful favorite of the day; while the house of Moratín, the dra-
matic poet [Moratín], 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 a tributary of his; but at the same time to his twenty-sixth year without ever prevailing 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 Godoy, where he became an intimate pupil of the poet, and worthy of the occasion and returned. Such an incident would have been noticeable in any country, but it was par-
ticularly to that country and age, for, as Alcalá Galiano remarks, in his excellent history of Spanish literature, trav-
ingen example has not been equalled 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 posthumous fame. It may be remarked that the patriotism, which is the animating principle of almost every one of them, is a very Gallican, but at the same time, narrow feeling. Two of these odes, which will be found translated into English in Kennedy's 'Modern Poets and Poetry of Spain' (London, 1835), are on the introduction of Wellington into Amiens by the Spaniards, and the battle of Trafalgar. In the first, after celebrating the great dis-
covery 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," &c;

by conveying it to her colonies, apparently forgetting that England imported the discovery not only to her own colo-

nies, but to the Indies, which at that time were all Spain, in spite of their at first receiving it with insulting suspicion. In the ode on Trafalgar, the battle is represented throughout as between the English and Spaniards, the French not being even honoured with a name. This is as uncharacteristic as the usual long poem as a very generous compliment to the memory of Nelson by saying, "As an Englishman, I abhorred thees; 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 del Drama'), and in this production he expresses unbounded admiration for Corneille and Molière, makes but lukewarm mention of Lope, Calderón, and Moreto, and none whatever of Shakespeare, though, probably in conse-

quence of his friendship with Melendez, he had studied in England. 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 Visso" ('The Duke of Visso'), acted in 1801, is acknowledged by the author to be founded on an English play. "El Quixote," another of his tragedies, not only in the description of the villain's dream, is evidently taken from the well-known dream of Osmond in Monk Lewis's 'Castle Spectre,' but in other respects the resemblance is very slight. The other tragedy, "Pelayo," which is somewhat better, is a collection of pathetic desola-
tions, some of them fine when separately taken, but quite undramatic, and reading like passages from the author's odes.

Up to the time of the French invasion in 1806, 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 law, etc. The liberal opinions of the patriot, however, man his reputation was constantly increasing. He edited 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, the 'Vidas de Españoles célebres' ('Lives of celebrated Spaniards'), communications which, however, 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 Juan de la Mora to the close of the 16th century, and appended to it a short history of Castilian poetry, supplying all the want of the kind that had before appeared, and which was afterwards rendered into English by Wiffen as an introduc-
tion to his translation of 'Garciasso 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, Me-
lendez, 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 enemies of Quintana became one of 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 supplied the French with documents of the first Cortes. His weekly periodical, 'El Semanario Patriótico,' was the leading organ of the patriotic party, and exercised great influence on the march of events, Quintana was as no uncomromising an advocate of liberal institutions against the French invader. The six years of the war were the most glorious of his long life. They were followed by six years of imprison-
ment. The return of Ferdinand VII. was to Quintana, as to all men who had earned his throne, a crown on his own head. Having been the advocate of the Cortes and of a constitution 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 pardon, and 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 out-
break of Riego's insurrection, on the 1st of January, 1830. He was then at once set at liberty, restored to his old dignity and 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 imprison-
ment. His detestation of tyranny was still strong, and his powers of composition were not less, but he seemed to have lost 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 resignation in the crown of Spain, while his friends and companions took refuge in England and France. Commanded to leave the capital he retired to Cabezas del Buéy, the town in Estremadura 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 Spanish Cortes, which were so much reviled by the French at the injustice with which they had been treated by England.

These letters, the last of which bears date in 1834, 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 1862. At the time of King Ferdinand's marriage to his third wife, Queen Maria Christina, in 1830, he sent an intimation to Quintana that he would be permitted to return to Madrid, if he would write an ode in honour of the event. The poet then showed the new king, it is said, that he had theretofore 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 compiled. The poem was published and pronounced a complete failure, and a portion of it, although Galiano, an excellent judge, considered it the worst Quintana had ever written. The poet returned to Madrid, which no longer regarded as inflexible, and found him-
self on the road to fortune. Soon after he was named a member of the committee of the Museum of Natural...
RACZYŃSKI, EDUARD, a Polish nobleman of literary tastes and talents, was born at Poznań in 1766, the son of Count Philip Raczyński, a Polish general. Count Eduard entered the Polish army, and took some share in Napoleon's campaign of 1807; but on the fall of Napoleon I., when he became a simple Prussian subject, he withdrew from a military career. He travelled in Turkey in 1814, and published an account of his journey in one of the most splendid volumes in the Polish language, 'Dziennik Podroży do Turcji' (fols. Breslau, 1818, illustrated withnumerous plates). The rest of his life was chiefly devoted to literary pursuits. His 'Obráz Polaków i Polski' (Picture of the Poles and Poland in the 18th Century, 21 vols., Breslau, 1840, &c.), is a valuable collection of memoirs, most of them before unpublished. Another of his most prominent works is his 'Gabinet medalowy Polskich,' or 'Cabinet of Polish Medals,' in 4 vols. 4to (Berlin and Poznań, 1841-45), with a text in Polish and French. His 'Wspomnienia Wielkopolskie' (Memorials of Great Poland, 2 vols, with an atlas of plates), is also deserving of mention. The 'Codex Diplomaticus Majoris Polonie,' or collection of documents illustrating the history of Poland, which he edited, had been originally compiled by his grandfather, Count Kazimierz Raczyński; but a companion work, the 'Codex Diplomaticus Lithuanus,' was his own. Among other benefactions to Poznań, he founded a public library in that town, erecting a building for the purpose, presenting to it a collection of 1,000 volumes, and endowing it with a fund for the maintenance of its books. He was one of the first historians and antiquaries in Poland, to whom the Count gave the appointment. On the 30th of January 1845 Raczyński destroyed himself, by means of an ornamental cannon which was kept in his park. It was currently reported that the motive of the act was, that in looking over some old family papers, he had found that one of his ancestors had received part of the family estates as a bribe from Catharine II. of Russia to betray the cause of his country. The lady of Count Raczyński, who survived him, was the widow of Count Jan Potocki, also a Polish aristocrat, who destroyed himself thirty years before in 1815. His son, Count Roger Raczyński, who succeeded him, generously abolished the feudal dues that were payable to him by 42 inhabitants of the twenty-seven villages on the estates of the family.

RÄDETKY DE RADETZ, FIELD-MARSHAL, COUNT JOSEPH, was born at the castle of Trebince, in the Kistaiszer district, in Bohemia, on the 2nd of No- vember, 1766. He was the son of Count Peter Ernst the elder Radecky, and of the Barones Maria Bechyna. The family name was formerly spelt Hradecky. Having entered the army as a 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, Wurmser, Altavilla and Melas, and distinguishing himself greatly at the battles 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 dispatches. For his gallant behaviour at the battles of Novi (May 16, 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 Luneville, 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-marshal. At the battle of Wagram, on the 6th of July, 1809, when the French army was defeated, Radecky was again in the thick of the battle. In April 1810 he was nominated commander of the military order of Maria Theresa. From that period until the end of 1813 his services were employed at home in the war-office.

During the whole campaign of 1813, when the tide of war had turned against Napoleon I., Lieutenant-Field-Marshal 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 yet over. On the 18th of October, 1813, he was appointed commanding general of all the Austrian troops in Germany, a post which he held until the end of the war. On the 18th of March, 1814, he was created field-marshall by the Emperor, and was appointed to the command of the newly-created Austrian army in Italy. He was in command of the left wing at the battle of Pavia, and on the 9th of March, 1814, he was made a field-marshall of Prussia. After the peace of Château-Thierry, he was appointed commander-in-chief of the army of the Lower Rhine, and was made a peer of the Holy Roman Empire. He was succeeded in this post by his brother, Count Paul Radecky, who was created a peer of Austria. After the death of Emperor Francis II., Radecky was appointed to the command of the army in Italy, and was created a peer of Austria.
he entered Paris, riding by the side of the Emperor Alexander. Radetsky was appointed in 1829 Commander-General of the Lombard Army and of the Neapolitan Kingdom; and in 1830, in his sixty-fourth year, after forty-six years of service, he was created field-marshal.

But it was the Italian insurrection, in 1848, which first gave Radetsky prominence as a Turkish general. As early as May 1848 manifest signs of a tumult and revolution were visible in Italy. The stringent rule of the Austrian government had long excited a ranncorous feeling in the Italians against their foreign masters, and they waited for an opportunity to reject the opressor and establish the liberties of their race. Austrian generals were scattered over an extensive line of operations. Consequently the insurgents were at first triumphant; the tri-color flag appeared upon all the towers of Italy, except those of Verona, Mantua, Legnano, and Peschiera; and Charles Albert, King of Sardinia, at Turin, made known his determination to throw off Austrian yoke. A dépêche was sent to Marshal Radetsky, 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 8th of August; and that the lives and property of the people were to be respected." The struggle was now virtually at an end. Radetsky's superior strategy, and the disunion of his opponents, rendered it an easy task for him to break up the Sardinian forces, and he was again master of Milan. A députation was sent to him by the citizens of Milan, and the terms of peace were concluded. Full of, and loaded with honors by his sovereign, he several times afterwards applied in vain for leave to resign his command. Not was it until the opening of 1847 that he obtained this permission, in a courteous letter from the Emperor, after a prolonged service of seventy-three years in the Austrian armies. He died Jan. 5, 1858, at Milan.

Radetsky married in 1798 the Countess Francesca Strasoldo-Güdenberg, by whom he has left a son and daughter.

RAFFLESIAEACE, a natural order of stemless leafless Parasitical Plants, consisting of flowers growing immediately from the prostrate roots of the cambial layer. The perianth is superior, with a 5-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 multicellular mass opening by a common pore. Ovary 1-celled; placenta parietal. Fruit indehiscent. The species are rare, and of which the best known is Rafflesia arnoldi. Several species of Osuna and some Lycopodites. There are 10 species. Some of them are said to be styrical. Their perianth has a fugguid appearance.

Rafflesia Arnoldi, a Somatric parasite, is capable of containing 250 lbs. of water. The flower is said sometimes to have a weight of 14 lbs.

R. Patna is employed as an astringent and styptic in Java. 

St. Horsfieldi, R. Cunningham, and R. Rochussenii have similar properties.

The genera are Rafflesia, Supria, Brugmannia, Aponekhas, and Pilostyles. (Balflour, Classbook of Botany; Lindley, Vegetable Kingdom.)

RAGGED ROBIN. [LOCHINN, S. 1.]

RAGLAN, James Henry FitzRoy, Baron (previously Lord Fitzroy Somerset), was the younger son of Henry, fifth duke of Beaufort, by Elizabeth, daughter of Admiral the Hon. E. Boscawen, and was born in 1788. He received his education at Westminster School, and before completing his sixteenth year obtained a commission in the 4th Light Dragoons. In 1807 he attended the late Sir Arthur Paget in his embassy to Constantinople; and was in the same year placed on the staff of the Duke of Wellington. The following year he was appointed aide-de-camp to the Duke of Cambridge, in which capacity Lord Fitzroy Somerset was present in every engagement throughout the Peninsular campaign. He was wounded at Busaco, and he was among the first who mounted the breach at the storming of Badajoz. Having been promoted to the rank of lieutenant-colonel, he attended the Duke of Wellington as aide-de-camp at Waterloo, where he lost his right arm; and in consequence of his military services he was made a K.C.B. and a colonel in the army. In 1814 he was made aide-de-camp to the Duke of Wellington, and the following year was appointed aide-de-camp to the French embassy at Paris, and so great was the confidence reposed in him that he remained in that city as minister plenipotentiary ad interim from the following January to March. He continued to act as secretary to the embassy at Paris until 1816, when he was appointed Master of the Ordnance andarrivée of Fitzroy Somerset to the rank of full general. He left England in March 1854, and after spending some months at Varna and Constantinople, during which time the army suffered very severely from sickness, he landed on the Black Sea, and joined the army in the Crimea. In conjunction with Marshal St. Arnaud, who commanded the forces of our French allies, he fought the battle of the Alma on the 30th of that month. It has been stated that he wished to attempt carrying Sebastopol by a coup-de-main, but this not being agreed to by his colleague, it was determined that it should be invested. Unfortunately, the siege proved one of longer duration than either of the generals had calculated. Difficulties in furnishing provisions and clothing for the troops, which appear to have lasted for a long time but feebly attempted to be overcome, resulted in a large portion of both the English and French troops perishing in the trenches before Sebastopol during the subsequent winter, 1854-55. The failure of more than one assault upon that city, the difficulties experienced by our troops in the sufferings he felt most tenderly, together with the censure of the English press upon his line of conduct, unhappily increased the symptoms of diarrhoea, by which he was attacked in the following June, and he died in camp before Sebastopol on the 28th of next month, leaving behind him the memory of an able and brave soldier and a general of high ability, who commanded at once the confidence and respect of his men.

The general orders issued by the commander-in-chief at home, as well as those issued by him, were divided command over the allied troops in the Crimea, bore testimony to his great and important services. His body was carried back to England, and interred in the church of Badminton, Gloucestershire. A life pension of 10000 a year was secured to his widow, and the children of a son who succeeded him in his title. He married, in 1814, Harriet, daughter of the third earl of Mornington, and niece...
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 Resident at Jaffna. His eldest son, a lieutenanit in the army, 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 botanist, John Ray, is known by the staminiferous flowers having a bell-shaped perianth in six deep oblong pointed segments, most spreading in their upper part. Corolla none; stamens with six filaments, bristle-shaped, shorter than the calyx; anthers simple. Pistillate flowers, the perianth bell-shaped, in six deep segments, permanent, withering; corolla none; pistil with the germen inferior, compressed, with a prominent border at one side, 3-celled; styles 3, the length of the calyx; stigmata obtuse; carpel innumerable, of three cells without valves, crowned by the calyx; two of the cells barren, almost obliterated, without wings; the third fertile, compressed, extended into a very large half orbamental 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 redish without any strong pungent smell; the bark white or yellow-coloured, little tough and warty, the flesh very white, tasting like a bean. The flowers small, whitish, 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. Plimmer 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 their base, and furnished with seven ribs continued from that part to the point. These ribs are connected by numerous transverse veins.

R. ovata, Oval-Leaved Raiania; has ovate-pointed 3-ribbed leaves, the margins of the bills of St. Domingo, and has a 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 numerous, 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 blossoms.

R. angustifoia, Narrow-Leaved Raiania, is a native of the western part 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 Thumbel at Hiroshahi and Nagasaki, and in Japan, growing in a wall and in parks. The stem is round, smooth, yellow-coloured, and branched. 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. heterophyllum, Six-Leaved Clustered Raiania. Leaves six, on a common stalk, oblong-acute. Flowers racemose. It is a native of the country of Fakonie, in Japan, among bushes, flowering in April. The stem is round, striated, smooth, climbing. The flowers in axillary racemes, clusters sub-umbellate, differ from R. quinata in having mostly six leaves 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, in a sub-umbellate form. D.E., or RAINIA, a sub-order, or family of Plagiostomous Cartilaginous Fishes, 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 back, the pectoral and caudal, called pectoral-pair, arise from the nasal part of the skull, and extend 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. Cephalopteridae, 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 long or longer than the body, with a conical spine, and a dark line on the flanks. The genus Cephalopterus has large lateral eyes and a transverse mouth, with small teeth like a file.

C. giuranis is the only species known in the European seas. A specimen of this fish was once taken on the southern coast of the British Isles, and has been reported as taken on the coast 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 Vacuna. It dies immediately on being taken out of the water.

2. Myliobatis, Eagle Rays.—The head is partially disengaged from the body; mouth large, with tooth-like vertiads wanting; tail long, with a back-fin on root and a serrated sting behind. The genus Myliobatis has flat teeth; the central plate much longer than those which are lateral; pectoral fins wing-like; the tail armed with a spine on the root, behind that a serrated one.

M. aquila, the Whip Ray, the Eagle Ray, and the Muller. This fish, though rare, has been found on the British coasts.

3. Trygonida, the Sting Rays.—The head is laterally inclosed by the pectorals; the teeth transversely elliptical; the tail without any fin, or merely a low vertical curricular hair. The teeth are more or less sharp and serrated, oval.

The genus Trygon has the characters of the family.

T. pastinaca, the Common Trygon, the Sting-Ray, the Fire FiUare, La Pastinque of the French, is an example of this family. It was well-known in the ancient and older literature with regard to the venom of the spines 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.


5. Raja, 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 in the mouth as in spawners. The skin of this skate is covered with 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 Skates are very numerous on the British coasts, and some of the species are used as food. The young are deposited in a similar manner to the sharks, in their horny cases of a square form, with four projecting horns, giving them the form of a butcher's tray. These cases are very frequent in the sea during the spawning time. The genus Aspius 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.

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R. radiata, Starry Ray. — A rare species.

6. Torpedoidea, the Torpedoes. — The head is very large and surrounded by pectorals, so as to form a circular disc; the tail is short, feebly, depressed at the base, cylindrical at the extremity; mouth beneath; teeth pointed or flat. These fish are many of them remarkable for their power of giving electric shocks; there are two species of Torpedo found on the British coasts.

Torpedo vulgaris, the Old British Torpedo, the Common Cramp-Fish, the Numb-Fish, the Electric Ray, and the Cramp-Ray. This fish is only occasionally found on our coasts.

T. nobiliana, the New British Torpedo. This is identical with the Torpedo of the Mediterranean.

7. Rhinobatos, the Beaked Rays, have the maxilla generally single, and the pelvis being united in the male; the young are born round or elliptical, in some broader than long, and often on summits of undulations; body smooth; caudal fin bicipital, or cut obliquely, forming one lobe, and two of these fishes connect the Skaros and Rays. The species inhabit the Mediterranean, the Atlantic, and the coasts of Brazil. They are not found on the coasts of Britain.

8. Pristida, Saw Fishes. — The snout is produced into a long flat cumin saw-shaped blade, with teeth on the lateral edges. The western Rhinobatids are very similar, and generally the skin is slightly ruffled; skin with very small, flat, roundish, or 6-cornered scales; mouth beneath.

(A. Adams, Baitte, and Barron, Manual of Natural History; Year Book for the British Fishes.)

RAILWAYS. — The first line to which an account was brought in the 'Penny Cyclopedia,' article Railway, vol. xii., and Trans, S. 1., no material alteration has been made in the method, and some account of the peculiar construction of some of their works, the general form of the cars of Bruxelles. There have been no new trunk lines undertaken, unless the North Kent be considered such, but the construction of branches and connecting lines has been pursued uninterruptedly; and there is now no important town in the United Kingdom which is not connected by a railway system, if not directly, at least by a short transit by means of omnibuses or other public conveyances. The legislation, therefore, has been principally as to deviations, connecting branches, the throwing of some of their lines, the granting of powers for amalgamation, for the purchase or leasing of constructed branches, and a few of the acts passed were for railways in the East Indies and the colonies. In 1846 there were passed 272 railway acts, 184 in 1847, 83 in 1848, 35 in 1849, 30 in 1850. In 1850, in June, were opened 6297 miles open in the United Kingdom, of which 891 miles were in Scotland, and 515 miles in Ireland, and the capital which had been authorised by parliament to be raised was 356,055,115l, of which 232,085,154l. had been paid; 52,063,154l. by way of loan; and 51,904,047l. had been paid in the year on shares, and 7,967,046l. had been raised by loan. During the year 72,648,242 passengers were conveyed by railway. In 1851 there were 61 railway acts passed, amounting to 92 in 1852, 69 in 1853, 82 in 1854, 76 in 1855, 60 in 1856, and 84 in 1857.

On Dec. 31, 1856, there were in the United Kingdom 8710 miles of railway open for public traffic; there were 10,650 miles in course of construction; and there were 2351 additional miles authorised, which had not been commenced at that date. On Dec. 31, 1857, there were 9091 miles open. The total amount of capital and loans authorised to be raised up to Dec. 31, 1856, was 777,777,507l., of which 307,894,086l. had been raised; the expenditure incurred through railway branches and works amounted to 52,329,419l., of which 25,008,901l. was in England and Wales, 13,397,128l. in Scotland, and 7,819,431l. in Ireland. During the year, 27 passengers had been killed, and 286 injured. The total number of accidents had been 281 killed, and 394 injured.

In the year 1857 the number of accidents had materially increased; there was the continuation of French railways and the opening of the line to Paris, 231,475, and the receipts for the conveyance of goods, cattle, minerals, parcels, &c., amounted to 13,011,748l. Of the goods traffic, 7,062,379l. were for the carriage of 23,833,031 tons of merchandise, 3,688,964l. for the carriage of 40,395,675 tons of merchandise, 3,127,001l. for the conveyance of 10,450,175 head of live stock, and 1,225,829l. for the carriage of parcels, &c. In England and Wales the receipts averaged 3190l. per mile, in Scotland 3092l., in Ireland 1094l. per mile; the average working expenses were reduced to 1270l., or 60s. per mile, in 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 civilised world should be similarly provided; that prejudice 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 Russia, the Dutch of the Low Countries, and the French of France and Italy, should now be travelling in the same way, with locomotives displaying the same kind of highly-finised mechanism, as the inhabitants of the more developed and commercial countries of Europe. We have yet to see whether European railways will form a chain of roads from one to another, 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 continental cities as Paris, Brussels, and Barcelona, and a line from Brussels to the French frontier at Quierne, making a total of about 247 English miles; in 1837 further lines were sanctioned from Ghent to Courtray, Courtray to Tourna, Braine-le-Comte to Namur, and Landen to St. Frond—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 Courtray in '39, to Tabwez in '40, to Mons in '41, to the French frontier in '43, and on the 31st of December last the 341 miles were opened; and these had cost 4,114,354l., 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 1856 were, from Ostend to Brussels, 91 miles; from Brussels to Mons, 77 miles; from Mons to Quierne, 50 miles; and from Quierne to Paris, 162 miles; from Brussels to the French frontier at Quierne, 50 miles; and from Mons to Quierne, 9 miles; from Brussels, by Malines and Liége to Herbeisol, which it joins the Prussian line to Aixe-la-Chapelle, 96 miles; from Landen to St. Frond, also joining the line to Aixe-la-Chapelle, 36 miles; from Bruges to Poperinge, joining a line to Calais, 59 miles; from Brussels to Mossen, connected with the line from Lille to Paris, 73 miles; from Brussels to Antwerp, 26 miles; from Ghent, 27 miles; from Mons to Quierne, 162 miles; from Brussels to Antwerp, 26 miles; from Ghent, 27 miles; from Brussels to Bazel, 51 miles; from Brussels, by Namur, to Verliers, joining the Aixe-la-Chapelle line, 65 miles; from Brussels to Ebelines, the direct Paris line, 65 miles; from Brussels to Namur, by Braine-le-Comte and Charleroi, 60 miles; from Louvain to Charleroi, by Wavre, 41 miles; from Brussels to Antwerp, 39 miles; from Namur to Wavre, 25 miles; from Wavre to Mons, 15 miles; and from Mons to Quierne, 90 miles. The Great Luxembourg line, of which only parts are completed, is to join the other lines by rail, and then by the lines from Paris to Nancy, Strasbourg, Cologne, and Mannheim. It is at present 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 communication from England to the centre and south-east of Europe.

The portion of this railway system near Liége required very heavy works; but the average character has been easier
In some cases, private enterprise has come to the aid of the Government and, instead of railways being formed from Paris to Versailles; and one or both of these are to form parts of the route to Brest. Another company formed the Boulogne and Amiens line, which works in harmony with the State line from Amiens to Paris, and the Paris and Orleans railway has a branch from Havre, and a branch made to Dieppe. The Paris and Orleans railway, made by a private company, has been adopted as the commencing portion of both the State lines to the Spanish frontier.

The position of France relatively to neighbouring countries, renders its system of State railways one of considerable importance. England, of course, has no other connexion with it than through the medium of the ports of Calais and Dunkirk, and the ports on the northern line; Havre, have railway communication with Paris. Nantes, near the mouth of the Loire, has a continuous railway route of about 270 miles to Paris. The Bordeaux line has been opened from Paris; but everything beyond Bordeaux, towards the Spanish frontier, is only yet in process of formation. The railway down southward, through the centre of France, has two branches, one of which is completed to Limoges, and is to be carried on to Bordeaux; the other goes by way of Tournon and Givors, and to Marseilles. The connection with Lyon, Tournon, and Alba, and the Belgian railway from Marseilles is open throughout its whole length. The Strasburg line has been opened throughout from Paris to the Rhine—a very important route in respect to the intercommunication between France and Germany. In the Western provinces, which are now rather thickly congregated; for not only is the traffic with England and Belgium important, but there is considerable mineral wealth in the district near the Belgian frontier. France, as a whole, has very few cross lines of railway; nearly all of them radiate from Paris as a centre.

Before noticing the railways of Germany, it may be well to say a few words concerning the thinly inhabited countries to the north, such as Denmark, Norway, and Sweden. The trade in those countries is comparatively small, and capital scarce, there has hitherto been neither a strong inducement nor a practical power to construct railways. But English capital has lately begun to flow thither for these purposes. The Danes have made for themselves a short railway of about 17 miles from Copenhagen to Roskilde, in the busiest part of the kingdom; but all the other railway projects, both in Denmark and in Norway, are connected with English enterprise. The attempt to establish a steamboat route from Lowestoft to Denmark, will be nugatory unless aided by the formation of railways; and many surveys have since been made in Holstein, Schleswig, and Jutland, to determine on the feasibility of such constructions. Germany has also a line, which separate Copenhagen from the German Ocean. In Holstein itself, which is Danish in ownership but German in feeling, there is a railway open from Antona to Kiel, with branches to Rendsburg and Glückstadt; but no railways have yet been opened in the more northern provinces of continental Denmark. A railway of 43 miles in length, from Töningan to Flensburg, one on the west and the other on the east coast of Schleswig, establishes a route from the German Ocean to the Baltic, and one 56 miles in length, also opened from Copenhagen to Cörsör. Other routes will very probably be determined on before any long time has elapsed, for surveys have been made, or are being made, from Flensburg to Rendsburg, and from Copenhagen to Kiel; and many of these lines are at the very time when Copenhagen may possibly be brought within two days' journey of London.

With respect to Sweden, nothing (that we are aware of) has been effected towards railroads in the lake-covered country, except two short lines from Örebro to Arbog, and from Örebro 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 Government. One of the lines is from Stockholm to 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 has made a connexion to Christiania, which has been extended to Mõßen; the former town is the capital, and near the sea coast; while Mõßen is in a lake connected with the extensive inland navigation of the eastern part of Norway. At pre-
sent this is only completed as far as Eidsvold, a distance of 48 miles.

In the wide-spread region to which the general name of Germany is applied—as extending as it does from the confines of Denmark in the north to those of Italy in the south; from the North Sea to the Rhine in the west, and from the Black Sea to the Baltic in the east—the construction of railways must necessarily be very unequally distributed, arising from the great diversities in population and commercial industry. There is, however, considerably of the central and important area of Europe which has been developed. Some of the railways have been constructed by the respective governments, and others by private companies. Nearly the whole of the territory in the Austrian empire, in Bavaria, in Württemberg, in Hanover, in Brunswick, and in Hesse, has already been opened up; and in Prussia, the construction of the railroads, which it has been moulded by companies have in most cases 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 government has 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 travel and more frequent stops are found in 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 Berlin, there is, that from Frankfurt to Berlin, a distance of 1500 miles of railway, in 1847 about 2800 miles, and by the end of 1849 about 4500 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 commenced; making a total, real and projected, of about 8450 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 desire to extend their lines further eastward of the German empire, in the direction of Poland and Russia. Scandinavia is also seen to be becoming a railway empire, with a line from Copenhagen to Stockholm, and another to the Russian frontier. The kingdom of Hanover has a railway from Hamburg to Zerbst, and a branch from Hildesheim to Braunschweig. A line from Strassburg to Aix-la-Chapelle, and another from Strassburg to Mannheim and Heidelberg, are under construction. A railway from Hamburg to the Baltic, and another from Berlin to the River Elbe, are under consideration.

Of the countries lying south of the Alps, and west of the Pyrenees, little can yet be expected in respect to railway enterprise; the great foundation of the Alp line from 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 and Interlaken, and from Lucerne to Lucerne, and from Lucerne to the Black Sea. There are also lines planned from St. Petersburg to Cracow, from St. Petersburg to Baltischport in Esthonia. The railway from Warsaw to Cracow is open, as also the line from Cracow to Warsaw, but in the other districts mentioned above, the work, so far as commenced at all, are proceeding slowly.

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In the vast Russian empire, the first attempt to obtain railways was made by offering great advantages to any capitalist who would establish companies for this purpose; they were to have a gratuitous grant of all the land necessary, and all the timber and raw material which they might find necessary; a subsidy of 300,000 roubles per mile; and a permanent 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 serfs in constructing the roads. The first railway to be planned was from St. Petersburg to Moscow, about 680 miles. A goods 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 Tsarsko-soelo to Luga, about 84 miles. This is a part of the Warsaw line. Tsarsko-soelo 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 commenced in a little time, and another from Odessa to Monastyr, and another from Odessa to the Black Sea. There are also lines planned from St. Petersburg to Cronstadt, and St. Petersburg to Baltischport in Esthonia. The railway from Warsaw to Cracow is open, as also the line from Cracow to Warsaw, but in the other districts mentioned above, the work, 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 enterprise; the great foundation of the Alp line from 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 and Interlaken, and from Lucerne to Lucerne, and from Lucerne to the Black Sea. There are also lines planned from St. Petersburg to Cracow, from St. Petersburg to Baltischport in Esthonia. The railway from Warsaw to Cracow is open, as also the line from Cracow to Warsaw, but in the other districts mentioned above, the work, so far as commenced at all, are proceeding slowly.

In Italy, distracted as it is by political disputes, and broken up into small states and republics, the railway enterprise has been much retarded. Down to the year 1845, nothing had 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 Lucca to Pisano, Florence to Sienna, Pisa to Livorno, and Florence to Prato; and in Naples the lines extend from Naples to Cava, and from Naples to Capua; from Rome a line of 12 miles is open from Roma to Frascati, and other works are in progress. In Austria, the plans of the year 1850, nothing had 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 Lucca to Pisano, Florence to Sienna, Pisa to Livorno, and Florence to Prato; and in Naples the lines extend from Naples to Cava, and from Naples to Capua; from Rome a line of 12 miles is open from Roma to Frascati, and other works are in progress. In Austria, the plans of the year 1850, nothing had 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 Lucca to Pisano, Florence to Sienna, Pisa to Livorno, and Florence to Prato; and in Naples the lines extend from Naples to Cava, and from Naples to Capua; from Rome a line of 12 miles is open from Roma to Frascati, and other works are in progress. In Austria, the plans of the year 1850, nothing had 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 Lucca to Pisano, Florence to Sienna, Pisa to Livorno, and Florence to Prato; and in Naples the lines extend from Naples to Cava, and from Naples to Capua; from Rome a line of 12 miles is open from Roma to Frascati, and other works are in progress.
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 so valuable to the rest of Europe. The main line from Madrid to Alarcones in Murcia, 174 miles, which it is proposed to continue to Zaragoza and Alicante. The other lines are from Barcelona to Arenys del Mar, from Barcelona to Granollers, from Barcelona to Martorell, from Barcelona to Reus, from Barcelona to Tarragona, from Barcelona to Reus, from Reus to La Jonquera, from Reus to St. Raphael, from Reus to Tarragona, from Reus to Valencia, from Reus to Cadi, from Cadi to Xeres (or Jerez) de la Frontera; and from Valencia to Alcudia; all of them short lines, the length of the longest being only 38 miles. Portugal has but one railway, under 30 miles in length, from Lisbon to Vicedos. The Mohammedan, imitating the European in so many things, is now imitating him in railway enterprise. The Pachas 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 amply discussed for several years past; schemes for ship-canaals and railways have been brought forward in considerable numbers, and speculation in railway shares has been great; 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. A number of railways have been opened, and 1100 in progress, to connect it with Delhi. But the terminus at Delhi, in consequence of the recent rebellion in India, it is now said, is to be changed, and that the railway is to be run by Allahabad to Umarkot, which is to be made the capital of north-western India. From Bombay lines are to run to Mirzaapore, where it will join the Calcutta line to Delhi, to Madras, and to Ahmedabad; on the first 49 miles, and on the second 71 miles, have been opened, but the remainder of the line, both in the distance and in progress, 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, 596 miles are in progress of construction. [INDIAN EMPIRE, p. 230, &c.]

In the United States of America, as early as 1843, we find that there had been more than 5000 miles of 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 the bondholders in each State were entitled to the proceeds of each railway was constructed mainly for local traffic, and still, nevertheless, it afforded a line of communication, by juncions 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, partly because the relatively low speed of travelling enables steep inclines and tight curves to be worked safely. 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; 5th, Philadelphia to Pittsburg, over the Alleghany Mountains, and comprising a system of railways and canals; 6th, Baltimore to the Ohio; 7th, Boston to Cincinnati, uniting the Atlantic with the Ohio; 8th, Great Western to St. Louis. All these routes were actually completed in 1843, but that sufficient had been done to show that such routes would result from the united labours of many companies influenced primarily by local interests, and that the whole had increased to 6500 miles. The Atlantic States, thickly 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; inasmuch 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 civilisation on the negro's forest home. 'In the moonlight the negro and the whiteman, both dressed in cabins, drift past 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 solitudes the stillness of which was never broken by a sound, there is the hiss of the red man, I have heard my own shrill, hollow voice, followed by a train of steam, shot by an engine driven by an artisan from Liverpool, and whirled at the rate of twenty miles an hour by the highest refinements of the art of locomotion. It is not easy to describe the sensation impressed on the indolent red man from its lair at the earring of the ponderous machine, and the appearance of the snake-like train which follows it."'—Railway Economy.

Of the 6500 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 from Philadelphia to Columbia on the Susquehanna. Then there are 175 miles of canal from Columbia to Hollidaysburg, which bring the traveller to the eastern base of the Alleghany Mountains. Next is the Portage railway of 37 miles, from Hollidaysburg on the Juniata to Altoona; thence the Alleghany branch of about 150 miles, which 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 Altoona to Pittsburg there are 86 miles, and from there to New York the Portage Branch of the east to west is complete. This fourfold division of the route is not so troublesome as it would be in England; as by an ingenious contrivance, the canal-boats are made available for land travel, the boats, which are of considerable magnitude and length, are divided into segments or sub-boats, by partitions made transversely and at right angles to their length; so that each boat can be separated into two or more smaller boats. When the canal route is traversed, these several segments are joined together, and the whole is raised to the summit level; on the other hand, with the railway the reverse is done. The short stumpy boat thus forms a passenger carriage or a goods wagon on the railway; while three or four of them form a spacious boat on the canal.

By about the middle of the year 1851, it was seen that the railways in the United States were more than 10,000 miles in length, having cost about 67,000,000$; or 150,000,000£. The average price of the land purchased for right of way was stated to be 11,500, besides 11,300 in course of construction, making a total of little less than 33,000,000$. An estimate for 1853 gives 13,000,000 as the probable length in the east, and at the same time, that ten miles a year is an average of increase in the eastern railway traffic. In 1854 there were 17,317 miles complete, and 12,250 miles in course of construction. Since that period there has been a fall, and the chief lines undertook to have been in connection with those of Canada. In January 1857 there were open and in work 29,340 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 large systems.

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 classes, whether this be an advantage or not, each reader must determine for himself. We shall simply state, therefore, that such is the case in the United States, and that the passengers—though they have not all the cushioned luxuries of first-class passengers in England—have far more comfort 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 more commodious; it is divided in three parts at each end, and a row of windows along each side. There is a door at each 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 fire. There is a stove 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 the horses were very large and racing vehicles were set upon the rails, the speed of the train would be so great that 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 coaches. As the road east of the railway track, on which it rests, is 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 level of the streets, but the passenger stations are in the heart of the town, the carriages 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 spoken of the railway tunnel; the railway tunnel 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 achievement. The machine is essentially the same as that used in building a steam-engine. A rapidly 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 periphery, and these cut a large circular groove in 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 railway 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 touching out four out of five of the Canadian lakes, and this, too, at many different points; these are yet almost wholly on the south or United States side of the lakes, for reasons before adverted to. It is a fact fraught with important social results, and is publishing itself to the public by the whistle of the locomotive, and that the cotton regions of the south are becoming connected by rail with the manufacturing states of the north. It would be useless to speculate on the probable amount of time saved by the rapid transit of the loco- motive, or the beneficial course which the valley of the great river will take within the scope of a commercial system which our own Stephensons introduced less than a quarter of a century ago. One of the Mississippi railways alone, from Lake Michigan to the mouth of the Ohio, will, when completed, be 700 miles in length.

In Canada a variety of circumstances prevented so early an adoption or so wide an extension of railways as in the United States, by which he had already made so much. The Grand Trunk Railway, 935 miles long, is now open from Portland in Maine, in the United States, to Windsor on the Detroit river. From Portland it crosses a part of New Hampshire and Vermont to Richmond, where a branch process northward to Quebec, 96 miles; the other line goes on to Montreal, a distance from Portland of 292 miles. It is to cross the St. Lawrence by the Victoria tubular bridge which is in course of construction, for a notice of which see in this number. The main line published by the Boston Post in the summer of 1860. Hence the line proceeds west-west- west by Hamilton and Kingston to Toronto, at the head of Lake Ontario, 333 miles; and from Toronto to Stratford and Windsor on the Detroit river, where it connects itself with a portion of the line, not open though nearly completed. The Great Western Railway runs from the Niagara Falls by Hamilton and London to Windsor on the Detroit, 239 miles; and from Hamilton to Toronto, 38 miles. The St. Lawrence is crossed by a suspension bridge of 828 feet span, and 255 feet above the water, available both as a railway and a common roadway, and connects the Great Western with the Rochester and Lockport line. There are also lines running from St. Lawrence to Collingwood on Lake Huron, 75 miles; from London to Port Stanley, 24 miles; and from Prescott to Ottawa, 54 miles. These, though independent lines, form junctions with the two main lines. A third line, parallel with the Great Western, but keeping closer to the river St. Lawrence, overlies and is supplied by the Great Southern Railway, to run from Niagara Falls to the Detroit river at Amherstburg.

In the colony of Victoria a railway has been for some time under construction from Ararat to Ballarat, and is now expected. In Jamaica a railroad was opened from Kingston to Spanish Town in 1846; and upwards of 500 miles of railway have been opened in Cuba. A railway has also been opened from Algiers to Beldia; and a line is in course of construction in Brazil, to run from Pernambuco to San Francisco, both on the eastern coast.

RALEIGH, or RAYLEIGH. [Emxk.]
RAMSBURY. [Wiltshire.]
RAMSEY. [Isle of Man.]
RANA. [Scotland.]
RANGIFER. [Denm.]
RANCIEFS, a genus of Subbranchial Malacocephalans, Fishes, belonging to the family Gadiformes. It has the following characteristics: Face naked; body compressed; dorsal fin, the first very small, the second dorsal and the anal fins elongated; ventral fins small, the first two rays lengthened and separated. R. trachurus, the smelt, or Forked Beard, the Tadpole-Fish. -Pennant describes two species of Rancieps, as belonging to the British Fauna, R. Jago and R. trachurus. Dr. Johnston, of Berwick, was the first to suspect they might be the same fish; and Mr. Jarrett, after comparing Dr. Johnston's specimens with descriptions by Pennant, of the spotted, comes to the conclusion that the two species mentioned by Pennant are one and the same. It is a rare fish; but Mr. Thompson records a specimen as taken in Ireland, and Dr. Farquhar describes it in his 'History of the Fishes of the Firth of Forth.'

RAOUOL-ROCHETTE, Désirée, an eminent French archeologist, was born at St. Armand in the department of Cher, on the 9th of March, 1799. Educated at Bourges, he was called to Paris when little more than twenty-two, to fill the chair of history in the Lyceum; 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'ancienne Gaule.' For ten years he continued to publish, but 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, in the royal academy, and was promoted to the rank of modern Swiss history he, during the following years, made several exploratory 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, 1853-56, 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, making various 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 1829 appeared his 'Antiquités Grecques et Romaines,' and another volume of the same 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 Académie, and contributing to the journals of other learned societies, and frequently appearing before the public in distinct works. In 1826 he published 'Monuments inédits d'Antiquité figurées Grecques, Etrusques, et Romaines,'
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8 vols., fol. His 'Peintures Antiques inédites' appeared in 1836. In 1839 he was appointed perpetual secretary to the Académie des Beaux Arts, the post previously held by Quatremère de Quincy; and, like his predecessor, he composed a large number of official elegies and resumés. In 1840 appeared his 'Dissertations de l'Académie des Beaux Arts' of 1836 and 1837; and in the same year 'Lettres Archéologiques sur la Peinture des Grecs' and in 1846, 'Choix de Peintures de Pompei.' His last work of importance—one which he describes in the introduction as having for its object 'to direct the investigations of the modern archaeologists towards the most felicitous course which, I believe, will prove fruitful in new discoveries—the relationship between Greece and Asia'—was entitled 'Mémoires d'Archéologie comparée, Asiatique, Grecque, et Étrusque,' but only one part was published (in 1846), and the publisher, Dr. Jean Larousse, who was occupied with the 'Premier Mémoire sur l'Hercule Assyrien et Phénicien considéré dans ses Rapports avec l'Hercule Grec. Except some controversial letters directed to M. Carnot, referring to some charges brought against him in respect of his official conduct, he does not appear to have issued subsequently any separate publications. He died on the 6th of July 1854. An English translation of his 'Lectures on Ancient Art,' by H. M. Westropp, was published in 1854.

RAUCH, CHRISTIAN, an eminent German sculptor, was born at Arolsen in the principality of Waldeck, on the 2nd of January 1777. He early showed an aptness for art, and received instructions in it from the sculptor Professor Rohl of Cassel. In his twenty-seventh year he had been presented to an office in the court of the Queen of Prussia; but his spare hours were all devoted to art. He here secured the friendship of Count Sandreycx with whom he set out in 1794 on 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. A due probation he produced several original works, among others, bassi-reliev of 'Hippolitus and Phaedra'; a 'Mars and Venus wounded by Diomedes;' a 'Child praying,' &c. But he continued to distinguish himself by his portraits, in the likeness of which he has continued to owe his chief celebrity, that of portraiture; 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 in 1810, the busts of a hero and a heroine, a work of high merit. 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 1812, in a style that secured his reputation. He then went on to Rome, where he remained till 1823, when he returned to Berlin, where he afterwards resided. During his second residence in Rome, Rauch was chiefly engaged on busts and statues; he executed for Emperor Francis, designed for the statue of the king himself, monumental statues of General Bulow and Scharnhorst. 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 Blücher; the first, representing the hero in vehement action, was erected with great solemnity at Breslau, July 9, 1827; the second, designed after Blücher's death, for the King of Prussia, represents the hero on horseback.

Another of his principal works is a seated bronze statue of Maximmilian of Bavaria, erected in 1835 in Munich. The 'Victories' for the Wallahia, near Batasim, are also from his hand. A well-known statue of Ghiberti, modelled from the life, is the greatest work of this great master of modern Germany. 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 abroad. His chief work, however, is the grand monument of Frederick the Great of Prussia, erected in the finest part of Berlin. This work, in the design of which Rauch was assisted by Professor Schinkel, the architect, and which called into exercise all the resources of modern art, was finished in 1839. The general model was completed in 1838; the colossal model of the king was not however ready till 1842, and the statue was cast in 1845. Four more years were required for the execution of the base-reliefs, and the statue was finally completed in 1850. The work consumed the whole of his life, and of some of the detached statues. The work is a sort of compromise between the severity of classic and the freedom of romantic art, and will not in its details stand the test of criticism. It is only as a whole that the work must be held to be one of the very finest as well as most imposing of recent commemorative works. And we may add that, even without this his master-work, Rauch would unquestionably stand in the highest class of modern portrait and historical sculptors, though not among the first in ideal sculptural. Rauch died Dec. 3, 1857.

RAUPACH, ERNST BENJAMIN SALOMON, one of the most prolific of modern German dramatists, was born at the village of Sariaupit, near Liegnitz, in Silesia, on May 31, 1784. He was educated at the town grammar school of Liegnitz, 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, was appointed professor of philosophy in the University there, to which in 1818 was added the professorship of German literature. In 1828 he quitted Russia, and having received somewhat later the solicited discharge from his professional duties, he travelled for a time about Germany, visited Italy, and at length returned and settled at Berlin. The result of his journey to Italy appeared in 1823 in "Hirsenwenzel's Briefe aus Italien." His dramatic productions, however, did not meet with much success. He afterwards, though many did not appear in print till long after they had been written. In 1837-38 he published his series of historical plays in illustration of events connected with the Hohenstaufen dynasty of emperors of Germany, which formed the groundwork of his dramatic compositions. His "Dramatische Werke" ("Dramatische Werke ernster Gattung" ("Dramatic Works of the Comic Species"), in 3 vols., 1838-39; and "Dramatische Werke ernster Gattung" ("Dramatic Works of the Serious Species"), in 19 vols., 1830-44). These works display considerable inventive powers, a great command over his materials, a thorough knowledge of stage resources, a sense of fitness, with a happy introduction of interesting situations. In his serious dramas he frequently deviates from established canons; but his comedies and farces, a rich voice of verbal wit. His poetic style is harmonious and natural, and he has consequently been a favourite with the public. His defects are a want of poetic consistency, a weakness of characterisation, and occasionally a lapse again parodied by Gervinus ("Bedeutender Teufel," and one or two others. His series of historical plays on the Hohenstaufen, by provoking a comparison with those of Shakspere, appear the most defective in dramatic execution. Raupach died March 1, 1858.

RAZABILL. [Arm.] RECEPACLE, in Botany, is that part of the flower which any of the other organs rests. It represents the

RAZABILL.
ternodes of the stem and branches in their changed condition. It assumes a variety of forms, and enters very variously into the forms of flowers and fruits. [*Calathidium; Flowers, S. 2; Fruit, S. 2.]*

**RED-BREAST.** [*Erythaca, S. 2.*]

**RED-SANDSTONE.** The term Red-sandstone is more especially applied to two formations, the Old Red-sandstone [*Old Red-sandstone, S. 3.]* and the New Red-sandstone [*Old Red-sandstone, S. 3.*]. 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 Shropshire, which together form an extensive and rich plain, watered by the Dee, the Mersey, and the Irwell, that the Old Red-sandstone is chiefly developed; and by a minute examination of these beds, and those of Warwickshire, the saliferous marls have been identified with the uppermost part of the foreign Triassic System. Throughout this range the beds are nearly horizontal, the dip rarely exceeding ten or twelve, and being constantly towards the east, or a few degrees north or south of that point. They are, however, affected by some important faults. The whole district is divided into two divisions, one being very fertile and plentiful 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 gypseum; with numerous bands of dun-sile, as that of the Esh, the Tanfield, or brown coal; and with sandstones, frequently marly, and of a red colour.

The red-marl district, with brine springs, is continued southward into Worcestershire, and northward into the vale of York, where the circumstances are different, the tendency also eastwards, occupying for the most part the plains through which the Humber and its tributaries make their way to the German Ocean. In Somersetchire and Devonshire similar sandstones recur, and lie unconformably, overlapping, and on top of the gypseum, or being separated against them, but uniformly composed of the same materials, remarkable throughout for the ocheraceous colour pervading them. Between Sidmouth and Seaton, in Devonshire, the red-sandstone contains quartz-particle of Silurian rocks and old red-sandstone. The total thickness of this part of the formation is considerable, but has not been accurately calculated. It is only to be distinguished from the overlying saliferous marls by small differences of mineral character. (Austed.)

Viewed on the great scale, the New Red-sandstone of England consists of three of the most varied and interesting we are acquainted with. There are peculiarities in its limestones, its sandstones, and its clays, as well as in its gypseum and salt deposits; the occurrence and nature of its organic contents, and the relation which it bears together to 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 in the gypseum. It occurs in the form of prismatic, broad-foliated crystals (selinite), fibrous masses and beds, and marmoird 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 characteristic of each particular mineral type. 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 appear in the tertiary period, and the secondary series (which receive their colour from protokidite of iron), and the fibrous gypseum 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 stratification, and appearing at the surface or in the internal surfaces which bound the mass. The marmoird texture is most commonly found in real however irregular beds, as at Montmartre, and in some points near Fairburn in Yorkshire, on the line of the York and North-Midland Railway. At these places fibrous, marmoird, 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 gypseum and redder sandstones, the clayey masses of clay and cavities of shells, &c., it appears that the redder sandstones, and the fibrous gypseum which appear in red-marl at Arnmouth, Ault Passage, and the Trent's mouth could be formed. The marls in which they here lie were deposited as fine mud, and if we suppose merely a slow extraction of the liquid, so that its contained salts might remain, the arrangement of these salt-bearing strata has taken place during crystallisation 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, and nearly as gypseum 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 marls. That such water, in the case of rock-salt, may have been generally the original source of the fibrous salts, or of the occurrence of iodine and bromine in the brine springs connected with them. (Daubeny's Memoir in *Phil. Trans.)* But it does not follow that the area in which the salt was formed was, at the time of its formation, or for some time previously or subsequently, a sea or sea-like, or even a continuous body of water. It may have been the theatre of the evaporation supposed, and the salt-sediments, such as occur in Cheshire and Poland, may have been drifted in by fresh waters or the sea, according to the parallelism of the processes, the occurrence of iodine and bromine in the brine springs, and the occurrence of the two great beds of rock-salt in Cheshire. It is not known that organic remains of any kind accompany the salt of Cheshire, but this is almost true of the whole range of the red-marls, in which these deposits are found.

We find, then, associated together, abundance of red-oxide of iron, salt, and gypseum, but few or no organic remains. The prevalence of red-oxide of iron in any of the strata is accompanied by a scarcity or total absence of organic remains. In the new red-sandstone 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 sandstones contains two distinct groups of these productions. Some geologists believe that if the strata pass uninterrupted upwards, we should be able to trace the fossiliferous strata of the Permian towards the south, the Carboniferous towards the north, and the Jurassic towards the east and west. (Cuvier.)

M. Adolphe Bronnemar (*Fossilies de la France,* 1839), comparing 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 oolites 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 Invertebrates which lie in the new red-sandstone have characters intermediate between the early (paleozoic) and later races of pre-Adamitic life.

Although the fossils of this rock are but few, they are highly interesting to the geologist and naturalist, being the first traces of an air-breathing animal. This creature, which was at first called *Chirotherium,* is now known under the name of *Lepidobranchia.* It belongs to the amphibious tribe of Reptiles. Footmarks of an extinct reptile have also been found in the red-sandstone of America, and described by Dr. Lea.

The equivalents of the British beds of the new red-sandstone on the continent of Europe are—*the Kaup Marls,* or *Marres des Bayeux,* the *Bunter Sandstein,* or *Grès Bigarre,* of Germany and France.

**REDPOLE.** [*Irenet.*]

**REDSCHID PASCHA, OF MUSTAPHA RESCHID PASCHA, was the son of parents in rather affluent circumstances, and was born at Tunis in the year 1800. He was the eldest of a family of eight, and his brother-in-law, Ali Pasha, attached him to his person, and employed him in the Mores and Brousse during his government of those two provinces. In 1826, when the
insurrection broke out in the Morea, Redchisd served in the campaign against the insurgents. After the death of Ali Pasha he transferred his services to Selim Pasha, who made him his private secretary in 1839. 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 instructions to act as a negotiator in the preparatory treaty of Kutahia 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 leading statesmen, diplomatists, and party leaders 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 the business of the House of Commons. Redchisd Pasha’s name was proposed as a candidate for the University of Oxford, in order to have an occasion to apply, on a professional subject, to the late (John, first) Earl of Morley, who, discovering the latent talents of the young engineer, took scarcely twenty-three years of age, and after the completion of the large bridge of the Lycus, an arm of the sea within the harbour of Plymouth, over which his lordship was proprietor of an ancient ferry, for which it was desirable to substitute a bridge, the south bank of the river Medway, on the completion of the large 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 construction from 1824 to 1827. For his account of this work the Telford medal of the Institution of Civil Engineers was awarded to him. About this period he designed and executed the Boucombe bridge, where hydraulic power was for the first time applied to the machinery for working swing bridges. Soon after the completion of the large bridge of the Lycus, Mr. Rendel settled in Plymouth, and there exercised his profession with great activity, being engaged in surveys and reporting upon nearly all the harbours in the south-west of England, and executing the works at a great number of places, acquiring that mastery over hydraulic engineering on which his fame will chiefly rest. In 1831 he introduced a new system of crossing rivers by means of floating bridges worked by steam power; they were applied at Saltash and at Torpoint on the river Tamar. The rapid progress of the railway system prevented the further development of this useful invention, for which the Telford medal was awarded. Descriptions of the structure of these bridges, as well as of that of the Lycus, are given in the page of ‘Transactions of the Institution of Civil Engineers.’ Particulars of the construction of the latter were also communicated by Mr. Rendel, in 1839, to the Plymouth Institution, of which he was a member, and published 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 imparting that rigidity to the platform of the road way which is now so extensively adopted. In 1838 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 the railways. 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collected, forms a valuable record of the state of engineering practice. The most incessant labor, and the mental anxiety inseparable from this undertaking, were more than ever felt, and required the most rigid self-control, 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 on the mud-banks of the Humber, was commenced in 1834. The grandeur of the scheme, the magnitude of the undertaking, the cost, and magnitude of the materials, and the success of the two great works which alone suffice to hang down his name to posterity besides those of Smollett, Rennie, and Telford,—the harbours of Refuge of Holyhead and Portland. Both these works were conceived with the largest views, and both were executed under the personal superintendence of Mr. Rendel, who, from the first, system was adopted of establishing timber stages over the line of the jetties 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 bringing up the mass simultaneously to above the level of the sea. 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 severe 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 shod with Mitchell's screws, which proved so successful at Portland—not a stone would appear to be lost, and the success of the system may be said to be complete, in spite of the sinister predictions which prevailed before it was tried. Amongst the other works upon which Mr. Rendel was engaged, should be particularly noticed the establishment of the military station and the improvements of the Nepean River. He was also 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 Kirkendall, Lancashire, and Cheshire 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 will connect the three mystery courts, the defendant being permitted to remove the cause from the latter, 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 8d. in the shilling; a practice confined to reprieves of distresses taken for rent in arrear or damage feasant: but the restriction is practically needless, for the other species of distresses known to the law have long been abolished.

REPRODUCTION IN 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 were 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 the organism. This form of reproduction is possessed even to the restoration of a lost limb amongst the lower animals, no such power is possessed by the highest.

The term Reproduction has also been applied to the origin 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 as an individual is ensured. It has once 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 seem to have supplied 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 should take part. At one time it was supposed that this process did not take place in the generation of the lower animals and plants, but recent investigations have shown that the union of two cells is necessary to so large a number of cases that it is a fair inference that this is a universal necessity 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, whilst the sperm-cell is that which communicates the growing tendency to the other. These cells...
of different sizes and forms in the animal and vegetable kingdoms, and no proof is adduced in any particular case in relation to organic beings, and the means by which they are brought together are very various, but in all cases they perform the same fundamental function.

The discovery of the necessity of the union of these two cells was an event of importance in the history of a science, and has gone far to settle the question of 'equivocal' 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 production of organic beings from inorganic substances, independently of the aid 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 smaller forms of animal and vegetable life are supposed to be produced under ordinary atmospheric conditions. By the time the occurrence appears of easy explanation, when it is remembered 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. That such is the fact is proved by the experiment of passing atmospheric air through red hot tongs or strong sulphuric acid, when it is found that water exposed to such air, if it be not already contaminated by organic beings, whilst the smaller water exposed to ordinary 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 now before us as well as any part of one 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 flowers and the leaves, and the oak and the thistle; but the one always produces oak-trees, whilst the others always produce apple-trees. It is the same with the cells of animals, without the slightest appreciable external difference; the one set of cells will develop the form of one species of animal, and another set, another species. 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 limitation of form to which each species is subject, as 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 of development, is usually supposed to call this a germ-force, or a germinal capacity; but 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, and not 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 absorption takes place.

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 circumstances is found 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, when in the latter 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, to which was ascribed the power of reproducing itself by its own nature, were found to be influenced by 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. Many insects are not hatched till a certain amount of external temperature takes 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 well-known experiment of placing a mouse in a room of 90 degrees of Fahrenheit's, the temperature of the animal being too high for it to live there, and on the subsequent removal of the animal to a room of 50 degrees of Fahrenheit's, the mouse became so chilled that it died; and yet in不到 45 minutes it became warm and lively again. The Brassociz pricina of the sea-shore is converted into red and white cabbages, cauliflowers, and broccoli, by garden culture. All cultivated plants exhibit more or less modifications of their form in consequence of the influence of physical and chemical circumstances. The dog, the pig, the horse, and man himself, present varieties which are manifestly dependent on external circumstances, and not on any change in the character of the formative or species-making principle. It is seen therefore that there is no change in the character of the species; there is a tendency in the tendency of the characters of the species; and it 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 communis), there are such great varieties of form that a thousand thousands of apple have been produced in Great Britain alone, there is not the slightest tendency in any of these cases towards confounding the specific character of the apple-tree and the pear-tree.

In what is called the alternation of generations [Generations, Alternation of, S. 3], it might be supposed that an exception is made to this law. It will be seen however that in all 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 egg-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 tissues 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, from which it is known that 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 'Verjüngung,' which has been translated by some into the term 'rejuvenescence' in this country.

Amongst plants the lowest position is assigned to the families Diatomaceae and Desmidiaceae, and it is amongst these that the most clear evidence has been obtained of the union of the cells in order to the production of the zoospores from which the new beings are developed. [Diatomaceae, S. 3; Diatomaceae, S. 3.]

The union of two cells is also seen in a large number of Conferenaceae, especially in the groups to which the Eugenolata belong. [Zonaria.]

Although amongst the Algae the production of spores be treated as the rule, and the number of connected cells 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 'Verjüngung,' which has been translated by some into the term 'rejuvenescence' in this country.

In the Fungi we meet with a variety of reproductive organs. At 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 spores occur on a basis or basidium.
This form of organ is best seen in Geaster. 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 subterranean plants, of which the Truffle is the best known example. The vesicle and its contents are usually perfect throughout which numerous sinuous cavities are intercrossed. Each cavity is partly lined, partly filled with the theca and the cells upon which they are supported. This receptacle, like the others, which are all of similar structure, originates from a pre-existing mycelium. In its unripe condition it displays, on section a number of sinuous empty cavities, which, during communication with each other, or open at one or more points of the external surface. As the Truffle approaches perfection there is complete separation between the contents of the young whitish mass to show that, on section, we observe the whole to consist of two substances—the one translucent, of firm consistency, 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, separate the cavities, is continuous with the external tissue which composes the envelope or peridium, and constitutes the venae isernia of Vittadini. The lamina which it forms consists of fine fibres, somewhat elastic, for the sake of its support. The white substance which occupies the original cavities of the tuber is formed of closed tubes, which are given off in great numbers from the surfaces of the lamina. These tubes, which are the terminations of the filaments of which the lamina is formed in the manner described, vary in 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 as than eight, divided by concave or convex septa, and sometimes large, others very small, or sometimes warty saccus, within which may be distinguished a smooth inner membrane, immediately enclosing the oospore and its contents. The ascomycetes 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 parasitically, may be aptly compared to a pustule, a grumous-looking substance, occupying, as it were, the place of the pus. On more minute examination of the cavity, we find that it is bounded by a kind of irregular wall, and lining of peridium cells, the smaller ends of which rest upon a peculiar cushion of mycelium. These 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, but not in the immediate vicinity of it, we can see numerous septa 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 tabular pedicle; while in the club-shaped upper extremity it is lined by a considerable deposit of granular protoplasm so that here the external cavity is very much smaller than that of the external membrane. It is in this cavity that the spore is formed, at first not exceeding in size, but afterwards increasing at the expense of the protoplasm, so as almost to fill the theca. In other genera, as in Phragmidium, there are pedicled 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 an accrescent capillary sheath, with three or four. One appears completely, but remains as a more or less constant membrane, giving the ripe spore to the spore-case which encloses it. Some of the Uredinae possess a cyst which remains unna of the periphery of the Sphaeria, to which they are evidently closely related. The cyst is formed (Ecdiium) 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 with a microscope, and it has been 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 this at once more important and instructive than that of any other family of the class. 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 (perithecium) is usually composed of polygonal tubular cells; it is lined by an inner layer, formed of the commencements of the paraphyses and the spores of the first order, which are connected. The theca is oblate cells, the membrane of which is of extreme delicacy. When fully formed, they contain from three to eight oval spores, the epispores of which are very delicate and pellucid, but by degrees become brown and opaque. The eusporal spores, as it is observed throughout the higher Fungi, consist of a fluid loaded with oily granules. The theca are arranged with their long axes perpendicular to the inner surface of the perithecium, and the spores placed below the thecae with a greater or less number of slender cylindrical paraphyses. The whole perithecium is usually enveloped in the filamentous stromata or mycelium, from which it takes its origin. The Discomycetes are represented by the Pezizae; between these and the Sphaeria there are differences of external form, which, though they strike the superficial observer as important, are in reality trivial. While the receptacle of the Spharia is a cyst with an open aperture, that of the Peziza is more or less tubular, the opening of which looks upwards. This surface is lined with an ascomycete membrane, which resembles in every respect that of a Spharia.

Along with the Peziza and Spharia, and those allied genera which resemble them in producing their spores enclosed in a cup, we consider the Pyrenomycetes and 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 in some of these forms of both mycelium and hymenial paraphyses, 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 suspicion of the existence of a 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 acrogenous spores. The earliest researches of Messrs. Tulane were directed to the Pyrenomycetes. In some species of Spharia, they found not only that the same stroma produces receptacles with acrogenous spores, which are followed by others bearing paraphyses, but that in some cases the stroma returns to form spore-bearing organs of a much simpler character; namely, branching filamentous pedicles, 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 Bhystinae, a genus of Discomycetes, which inhabits the epidermis of the leaves of 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-shaped, and their spores are produced within the cavity of the Spharia, and are entirely occupied by a pulpy nucleus, which consists of slender branched filaments, of small size as to project considerably beyond the aperture. These filaments bear at their extremities minute linear spores, which are enveloped in an 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 contents, the stroma is replaced by a perfectly perfect Bhystina. These do not arise at maturity until the following spring, and bear upon their upper surface theca and paraphyses, like those of a Peziza. In other genera to Tulane's researches, the ascomycete receptacles are preceded by capsules, which precede instead of the linear spores above mentioned, cylindrical spores of a much larger size, each of which is supposed to be the extremity of a pedicle of its own.
Thus in the plants under consideration we find that, without crossing the spores which are produced by filamentous threads directly from the stromata, there are no less than three varieties of sporé-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 there are filaments bearing the spores, and forming the normal thcme, paraphyses with innumerable slender linear sporules at their extremities. As has been already hinted, the capsules which contain acrogenous spores, have been hitherto considered as belonging to a distinct and entirely different class represented by the ascocarpous receptacles with which they were found associated. The genus Cryptopus is characterized by a structure which corresponds completely with that of the capsules described above in Myosotis; and other genera, of the acrogenous sporulæ, have a similar relation to the capsules, containing the larger variety of pedunculated cylindrical spores.

We know less of the reproductive organs of the Lichens; they however closely resemble those of the Fungi. The following is a summary of the reproductive organs found in these two orders:—I. Sporules which are formed by the constriction and separation of the extremity of a simple cylindrical filament. 2. Spermatozoids, with their supporting pedicles. 3. the asci or ascides, with filaments, or sacculi, Basidia, with their basidio-sporæ. Although the evidence is as yet imperfect, there is still good reason for supposing that the asci and spermata are truly sperm-cells and germ-cells, whilst the other organs represent the germ or buds.

The Vascular Cryptopus, or Cryptopus, is given under the articles Floris, 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. Henfrey in a report made to the British Association in 1851, says, in regard to the question of sexes,—"We have several kinds of evidence:

1. The inferences to be deduced from the universality of the existence of these two kinds of organs in concomitance 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 Hepaticæ they occur in the full course of the plant. In the Ferns and Equisetæ 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 Equisetæ. In the Lycopodiaceæ, the Isoetaceæ, and the Ricciaceæ, the pistillata occur upon very transitory cellular structures produced from one kind of spore, the larger, whilst the smaller spores at once develop in their interior cells containing moving spiral filaments, and which occur in the antheridia of the other families.

2. The inferences to be deduced from the observations 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 diocious Mosses and Hepaticæ do not parallel the sex of the plant; and the whole of the antheridia are kept apart from the antheridia by natural accident. The majority of observers state that the large spores of the Ricciaceæ do not germinate if the small spores are all removed from contact with them; a few counter-staements have been made. Again, the majority of authors, and all the recent ones, state that only the large spores of the Lycopodiaceæ and Isoetaceæ produce new plants; while some older writers believed that they had seen occasional exceptions.

3. The direct observation of a process of fertilization, of which we have only testimony from two authors, Sarninski and Mercklin, in reference to the Fern alone; since the observations of Schleiden in regard to the Ricciaceæ have been demonstrated by Nägeli, Hofmeister, and Mettenius to have been based on very imperfect observations." To the question as to the homologies of the organs in the higher Cryptopus, Professor Henfrey gives the following answer:

"In the Mosses and Hepaticæ the pistillata 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 fertilization take place here, we may regard the antheridium as analogous to the pistillate flowers of flowering plants, the sporangia of their fruits; or with Hofmeister we may regard the phenomenon as an instance of an 'alternation of generations,' where the pistillata would be looked upon as an ovule producing (in the sporangium) a new individual of totally different character from that developed from the spore (the leafy Moss plant in the usual acceptance of the term).

In the Ferns and Equisetæ, we find the spores producing a frondose structure of definite form, upon which are developed the spore-bearing organs; and it is here we seem to have one generation complete, and the new development from the pistillidium or ovule appears in a totally new form, producing stem and leaves which have a distinct individual form and existence. We may therefore describe the spores after a long period upon temporary parts of the structure, on the leaves; and by no means cease to exist when those are matured. Here we seem to have a real 'alternation of generation,' and Hofmeister compares the whole permanent plant to a sporangium, and the pistillată to the ovule of Mosses and Hepaticæ. In all the other families, the Lycopodiaceæ, Isoetaceæ, the Ricciaceæ, the pro-embryo is a very transitory production, and is developed from a different spore from the spore-sporules. This pro-embryo is in analogies to that of the Ferns and Equisetæ; and if the existence of sexes be a fact, we have here a diencephalic condition as contrasted with a monoeocious condition in the two last-named families. Hofmeister here again assumes that these pro-embryos are intermediate generation between the two perfect forms of the plant.

It is rather difficult to decide upon the real analogies of these structures with those of the flowering plants. This is more especially the case with the Hepaticæ and Mosses; and, in the case of the Vascular Cryptopus, that they must be regarded as analogues, and then the former could not well be conceived to be analogous to the spore-sporules of the flowering plant; but neither is this the case of the ovules; if this be the case, the sporangium must be considered the analogue of the perfect plant in the Fern, &c., and the leafy stem as the analogue of the pro-embryo of the Fern, &c. The pistillidium of the Mosses can indeed be compared to the ovule of the flowering plant, in that case the spores would be ovules produced long after fertilization; and on the other hand, if we consider the pistillidium of the Moss as an ovule, which it might be, analogous to the leaf of the flowering plant, in that case a large number of embryonal vesicles or rudiments of embryos are produced after fertilization on the branched extremities of the suspenders—then we seem to lose the analogy between the product of the pistillidium of the Moss and that of the ovule of the Fern, unless we would regard the entire plant of a perfect Fern as analogous to the ovule of a Conifer.

We close this part of our subject with a tabular view (given in the next page), of the analogies in the development of different classes of plants, drawn up by Dr. Sanderson.

The process of generation is much more clearly apprehended in the flowering plants. Here we have two sets of organs whose functions are clearly and definitely the production of the flower and of the seed. The flower is composed of a number of cells, and the germ-cells are prepared as the Pistil, whilst the Stamen, in that part of its structure called the Anther, elaborates the sperm-cells. In the pistill the germ-cells are called Ovule, or Seed-Buds; whilst in the anther the sperm-cells are called Pollen, or Pollen-Grains. In the growth and development of both these sets of organs great differences are observed, but their function is always the same.

The history of the development of the ovule of Orchis Mortonia will serve us as an example of the flowering plants. In this plant the ovule springs from a placental surface as a single projecting cell, which by subdivision forms at last a central cell called the nucleus, and this becomes surrounded by a layer of cells. This nucleus, or central cell, becomes the embryonic germ-cells. The pollen-cells from the anthers having fallen on the stigma, now pass down the passage of the style, and at last, through a little opening in the ovule called the micropyle, come in contact with the central cell inside of the ovule. Within the embryo-sac are to be observed at this time three small cells called embryonal vesicles. "Soon after the pollen-cell has reached the embryo-sac, one of the embryonal vesicles begins to enlarge, and becomes divided by a cross wall into two parts, the egg- and the polar region, and ultimately in a filamentous form through the micropyle by a continued process of cell-division, the lower cell enlarges and divides repeatedly, so as to become a cellular globule." (Henfrey.)
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 of the stamen called the anther 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 their 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 become the parents of the true sperm-cell or pollen-grains.

The walls of these parent cells now become thickened, their nuclei disappear, but are replaced by four permanent nuclei, which become each invested with a primordial sac. In this manner each of the parent cells is divided into four compartments. A cellulose intumescence is afterwards formed over each compartment, which now become the pollen-grains. Like the nucleus or embryo-sac of the ovule, these pollen-grains have no further power of independent development or growth, but by contact with each other the embryo of the seed is produced. When the anther is fully developed, the external case which contains the pollen bursts, and pollen-grains are distributed upon the surface of the stigma. No sooner does the pollen-grain arrive upon the stigma than it

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| Tabular View of Analogies in the Development of Different Classes of Plants |
|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| **Algae, Fungi,** and **Lichenes** | **Filices.** | **Rhodophyceae.** | **Lycopsidae.** | **Phanerozoaria, Gymnospermae.** | **Phanerozoaria, Aprosperma.** |
| Germination results in the formation of a Conchophor, Myxocillum, or Phytophylaxis. | Germination results in the formation of a Sporangium. | Germination consists in the development within the inner membrane of the spore of the Megasporangium. | Germination consists in the releasing of the inner membrane of the Megasporangium. | Germination represented by the growing out of the inner layer of a chromosome. |
| Inferior of the two cells which unit from the archythallium. | Unknown. | Unknown. | Unknown. | Unknown. |
| Primary Parthen-Celled divided into four special Parent-Cells, each containing a Spore. | The same. | The same. | The same. | The same. |
| The same. | The same. | The same. | The same. | The same. |

I 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-sac 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-sac, or becomes part and parcel of the new embryo. Schleiden maintains that if the pollen-tubes be followed into the ovule, it will be found that usually one, and rarely more penetrates the intercellular passages of the nucleus and reaches the embryo-sac, which being forced forward, is pressed and indented, and by its folding-in, forms the embryos in the first stages of development. A bag 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 it, 2. The invariable chemical similarity of its contents shown by the reaction produced by the action of water and of sweet almonds, iodine, sulphuric 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 transparent and colourless fluid, which becomes gradually more and more opaque; and is consumable by the application of alcohol; out of this, by an organising process, the cells are produced which fill the end of the pollen-tube, extending in Orchis Moifo far beyond the ovule, and thus forming the parenchyma 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.
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 destroyers which frequently extend to the entire limb. This is seen amongst the Rakiota, especially the Echinoderma, also amongst the Articulatea. The highest families of animals in which this kind of reproduction occurs regularly are the Suckers, and in each such institution cells are being renewed. Occasional 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 the same sort was also reported in which the leg having been removed, it was again reproduced almost entirely.

Reproduction by division into two, or by gametom. The Siphonar and Gemmiferous methods of Reproduction, occur to a very considerable extent among the lower animals. These modes of reproduction do not essentially differ, and both occur in the same families of animals. [Hydra, S. 2; Polyzoa, S. 16.] The individuals which are thus produced by fission or by gametom are called Zooids. This process occurs in unicellular as well as in multicellular plants and animals, and the single cells produced by the division of the Blastula, the Dictyostylus, and the Vorticella, are as much entitled to the term Zooid as the more complicated forms of the Ascomycetes.

The generative act is performed in animals in the same manner as 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 organization that have developed on this plan. In the generation of new plants and germ-cells occur. They are described in considerable detail in this work under the head of the families, and sometimes of the genera and species of the various animals described. We shall however describe generally that sperm-cells and germ-cells in animals 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, the sperm-cells and the germ-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 Phananogamia, 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 animals the sperm-cells often move as distinct, free-moving filaments, they most closely resemble those of 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 conical extremity. At one time they were regarded as a kind of animalcule, and called 'spermatic animalcules', 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-dicks, or ciliated epitheliums. The movements 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 the movements are due to remittances of activity. At one time it was very obvious to bring the spermatozoon, as these spermatic filaments have been called, into contact with the germ-cell. These movements soon cease after the filaments have been removed from the matrix in which they have been formed. Some agents rapidly destroy these movements, whilst others renew them after they have apparently ceased. This subject has been recently investigated by Kölliker, and the results which he has arrived at in regard to the movements of filaments of Mammalia, are embraced in the following propositions —

1. In the spermatic fluid, taken from the epididymis and vas deferens, motile spermatic filaments exist in very great abundance.

2. Spermatiferous and aqueous solutions of all innocuous indifferent substances and salts, the motion of the filaments ceases, and they form loops.

3. These filaments, thus furnished with loops, are not dead, as has hitherto been generally believed; for on the
12. 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.

4. Certain vehicles, when considerably concentrated; or highly saline, which are not too acid nor too alkaline, nor too viscid, the motions of the spermatic filaments are uninjured; this is the case, for instance, in blood, lymph, alkaline or neutral urine, alkaline milk, thin mucus, thick bile, the gastric juice, the juice of the gall-bladder, decrystallized ammonium uric acid, milk or mucus, the gastric juice, thin bile, and thick mucus. When the proper degree of concentration of the latter fluids is successfully attained, and their reaction is rendered neutral, they are innocuous.

5. Certain indifferent substances moderately concentrated, the filaments move with perfect facility—thus in all kinds of syrup, in albumen, urea, glycerin, salicin, amygdalin. More concentrated solutions of these substances cause the motion to diminish, but is restored by their subsequent dilution with water. Too dilute solutions act in the same way as water (vide 2 and 3).

6. Certain solutions, as they are termed of indifferent organic substances act like water, however much they may be concentrated, such as solutions of gum arabic, vegetable mucus (gum tragacanth, mucilag of quinse-seeds), and of dextrin. Concentrated solutions of other substances, in this case also, restore the motions.

7. Many organic substances cause the motions of the filaments to slow down, and chemically affect them, as alcohol, cresote, tannin, and ether; others owing to their mechanical effects, as most oils. Narcotics, in certain degrees of concentration, are not injurious.

8. Metallic salts are injurious, even in extremely dilute solutions; 1 part of a solution containing 1-10,000th of a corrosive sublimate is fatal.

9. Most of the alkaline and earthy salts are innocuous in certain degrees of concentration, which in some is greater and in some less; so little hurt they do, and fact, are, that some of the filaments may be kept alive in them for from one to four hours. Among these may be enumerated solutions of common salt; chloride of potassium; sal ammoniac; nitrate of soda; nitrate of potash, containing 1 part to 100; moreover, solutions containing from 2 to 10 parts in 100 of phosphat of soda; sulphate of soda; sulphate of magnesia; chloride of barium. As regards some of these salts, the fact had been previously noticed by older writers, and more recently by Quatrefages, Newport, and Ankermann. Solutions unduly diluted have the same effect as water, and cause the formation of loops, but the filaments are revived upon the addition of a concentrated solution of the same salts and of indifferent substances (sugar, urea, &c.). Stronger saline solutions than are required, at the same time as the presence of filaments like those just described, the filaments are capable of revival upon the addition of water. These saline solutions can be regarded properly as revivers, as was asserted not long since by Molecules and Ricchetti, for filaments which have become quiescent in indifferent solutions, can be brought back to life again by them; and their action is widely different from that of the real excitant—the caustic alkalis. It cannot be denied that their influence is very favourable, and that (but perhaps owing only to their rapid diffusion in the water) they produce motion in a semisaline mass more rapidly than other less diffusible substances, such as sugar and albumen; on which account the above-named authors ascribe reviving properties to them—a fact which, before them, had been made known to posterity by Ankermann, who stated that the uree, Newport, for carbonate of soda and potas; which latter substances, moreover, in certain experiments, caused the motion to cease in 10' or 15', almost like the caustic alkalis.

10. Acids, even in very small quantity, are injurious; such as hydrochloric acid, in the proportion of 1-10,000th of their liquid.

11. Caustic alkalis (soda, potas and ammonium, not lime and barytes), in all degrees of concentration, from 1-5th to 6-10th, are special excitants of the spermatic filaments. Venoms, which is stated above, can be used in the old sperm-fluid, or have ceased to move in indifferent solutions, the above substances recall the most active movements which are not distinguishable from the vital. But these motions cease after two or three minutes, and from this quiescence the spermatic filaments are not in any way benefitted—spermatic filaments are, with indifferent substances in small proportions (from 1-1000th to 1-500th), as, for instance, in syrup, the caustic alkalis afford a means by which the motions of the spermatic filaments may be maintained for a long time.
"The substance that combines the globules 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 tenaciously retained in the cavity of the solid globular mass when the zona pellucida is torn. It is, 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 imbibition through the zona pellucida, and that the vitellus is destined to fill another, a solid, or a thin and delicate membrane. From the appearances resulting from the action of water on the ovum, and from other circumstances, it has been thought that the mass composing the yolk is surrounded by another membrane within the zona pellucida, but the evidence of this has not satisfactorily been established.

"In the substance of the yolk is imbedded the germinal vesicle, or vesícula germinativa. 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) and is therefore not seen by the naked eye. Whether the germinal vesicle is a true yolk of the ova, or whether it is the essential part of each egg, has not been ascertained, owing to the difficulty of isolating it. It consists of a fine transparent structureless membrane, containing a clear watery fluid, which in some are sometimes a few granules. In the common rabbit's egg the germinal vesicle, which is nearest to the periphery of the yolk, is situated the germinal spot, a finely-granulated substance, of a yellowish colour, strongly refracting the rays of light, and measuring, in the Mammalia generally, from 1-3600th to 1-3400th of an inch in diameter (Cuvier). (Kirkes and Paget, 'Handbook of Physiology.')

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 how this occurs. The following facts, however, are commonly 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 spermatic filaments come into 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 admission of the spermatic filaments, but a minute aperture in this membrane, and may be seen floating about in the yolk. Mr. Newport found that a single spermatozoon did not produce fecundation, but that the penetration of several were requisite for this purpose.

In the human ovum, the ova are brought from the ovaries 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 inclosing the other, and the inner containing a liquid. When it is about half a line in diameter a new element becomes visible in it; a round, opaque, granular disc is 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 cicatricula of the egg, and is the first rudiment of the foetus. In birds the cicatricula, or germ-spot, lies upon the surface of the yolk; soon after the commencement of incubation it expands and separates into two layers; the outer is called by Pander the serous layer, and the inner is formed from the osseous, muscular, and tegumentary systems of the body; the inner, which is in contact with the yolk, is called the mesothelium, which (together with a third developed between the two others) forms the yolk-sac. The yolk-sac expands to rise, by the changes which it undergoes, to the intestinal, respiratory, vascular, and glandular systems. The mucous layer of the germinal membrane gradually expands over the yolk-sac, and shews itself in a sac, which towards the body of the chick contracts into the alimentary canal, 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 allantoid membrane. After a time arteries and nerves ramify in the allantois, and this gradually extends more and more out of the body of the chick, 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 yolk-sac, or alimentary canal, and the skin under the 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 in the egg of a bird; though there are some curious variations not to be described here. When a certain latitude is examined, the embryo is seen suspended in a loose bag filled with fluid, called the amnion, which is a shut sac; this sac is the outermost product of the serous layer of the germinal membrane; for its formation a membrane 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 amnions is ruptured, the amnioscopic sac is drawn in, and at length is limited to the edge of the umbilical opening; it then invests the umbilical cord, and spreads out from its placental extremity into an amnion sac filled with fluid; is now entirely cast off, and is attached at one point only, the umbilicus. The membrane in Mammalia is supposed from analogy to form a sac, as in birds, containing a yolk, or substance subservient to the nourishment of the foetus in its early stage. Whether this view of its formation and use be correct or not only rests on conjecture. The umbilical bladder, which from its being filled with a whitish fluid has been called the vesícula alba, may be found on the placenta, at or near the extremity of the umbilical cord, and exterior to the amnios; from this sac a fine tube may be traced along the cord to an opening in the skin and membrane, in which it is communicating with the intestinal canal. This tube becomes obliterated so early (Valpeau says in the sixth week of gestation) that its communication with the intestines was long undetected; though the sac was known to the old anatomists. The intestinal vesicle finally differs in Mammalia and birds 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 communicates with the superior mesenteric, and the vein with the inferior mesenteric. This sac, therefore, as well as in birds, though its use in the former, which are furnished with a placenta, 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 Corvacea, etc., it is still in operation and continues as an organ of foetal existence. In Mammalia it communicates with the fundus of the bladder, and the remains of the duct by which it is connected is denominated the urachus. 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 the embryo impregnation has taken place, a spongy 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 pushes the decidua sac, which is stretched out, and inserting one portion of it which surrounds the ovum, and is called the decidua reflexa; this grows with the ovum till it fills the cavity of the uterus, and comes in contact with the inner portion called the decidua vera, lining the walls of the uterus. The point at which the decidua is reflected upon the ovum is where the placenta is fixed to the uterus. The ovum has two proper membranes, the amnios, which we have described, and the chorion; this latter membrane in man, during the first two months of pregnancy, has a shaggy external surface, being covered with vascular villi, which become united with the
membrana decidua, which is also thick and vascular. This thickening and vascularity of both these membranes gradually increases, and the vessels composing them usually point 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 vesicles or vesicular elevations, from thirty to one hundred, which are called cotyledons. These vascular processes dip in corresponding processes attached to the uterus of the mother, which are called maternal cotyledons, the surface of which is supplied with numerous vessels descending from the arteriae uterinae, and 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 body of the mother. The surface is 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 radicles of the umbilical arteries cannot be distinguished, and no communication has ever been shown to exist between them and the utero-placentine 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 un.injected substance, and the uterine surface will not be injected, for the fetal vessels do not pass all the way to that surface. In like manner, if we inject from the uterine vessels, the placenta is rendered turgid, and relations similar to those already stated. 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 pulmonary vessels, the artery terminating in the vein. But the manner of termination of the umbilical vessels differs from that of the communication, but the arteries, as Mr. Hunter thought, seem to terminate in irregular cells, and the veins appear to commence with open mouths from these cells, for by throwing wax in the uterine arteries we fill the cells, and frequently the veins also. It has always been considered doubtful whether the placental 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 placenta we may infer that it is very similar in man to what it is in ruminating and other animals; it must 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. The umbilical vessel, 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 umbilicus, and the remains of the duct of the vesicula alba and omphalo-mesenteric vessels. It is visible in the human embryo in the sixth week as a short and straight cord; at birth the length of it is, on an average, about two feet. The outer tunic of the cord, the amnion, is a serous membrane, also has the same name, 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 development of the embryo is marked by the development of the principal organs of the human embryo. The future embryo. It consists of a very small longitudinal groove in the middle of the upper surface of the serous lamina. In this groove the amnion is raised to form the laminae dorsales. They grow over towards each other, meet in a longitudinal suture, and thus inclose a cavity, the primitive tube. Anteriorly this tube dilates into the neural vesicle, which lies behind each other, and in which is deposited the cerebral substance. The latter is divided 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 conditions in various of the lower animals. A dense cord, the chorda dorsalis, is early deposited beneath almost the whole length of this primitive tube. At the same time, square spots are observed on either side, symmetrically arranged in pairs. Each two corresponding squares subside towards each other, to construct the body of a vertebræ. In doing this, they include between them a corresponding segment of the chorda dorsalis, and gradually altogether displace it. In Mammalia and birds, the remaining portions of this structure subsequently disappear. The vertebral arches commence as dense curved pairs of streaks; each of which unites on the one hand with the body of the vertebrae, and on the other with its opposite fellow. The various processes of the vertebrae are only added subsequently. The first rudiment of the skull is formed by a membranous capsule, which gradually merges into a special cartilaginous covering, called the primordial skull. Some portions of the membranous capsules are formed by a similar process, and others disappear after new pieces of bone have been opposed to them. The blastema adjoining the interior surface of the skull produces a series of pairs of processes, which gradually give rise to the chief structures of the face and neck. Those which lie between the future mouth and the teeth, and are called the branchial or visceral processes; and the fusions which remain between them, the branchial fusions. Their form is similar to that which supply them source, and give whatever type the met with in the gills or branchial respiratory organs of the fish.

The margins of the central portion of the serous lamina are gradually involuted, so as to form the walls of the thoracic and abdominal cavities. But as they only subsequently meet in the inferior median line of the embryo (which we are supposing to be horizontal), there remains at first a long fissure, through which is protruded the heart, a large portion of the liver, the gonads, and the hinder parts of the cranium, and nerves which afterwards close in the region of the thorax, and the posterior part of the abdomen; and finally disappears, leaving no relic save the navel. The rim commences as dense striae, which first become cartilaginous, and are then ossified. The several pieces of the thoracic and abdominal wall are developed in a very free manner, each possessing a free terminal plate which is developed into the hand or foot. The fore arm and leg are only formed subsequently. The fingers and toes are at first united by a kind of web, so as to resemble fins. This membrane begins to disappear from without inwards. The eye at first forms a hollow vesicle, which is connected with the brain by a tubular handle, the future optic nerve. The retina is produced from a deposit which resembles that of the chordee in the mammalian brain. The crystalline lens, the vivid humour, and the iris, are only developed subsequently. A special vascular tunic, the capillaro-papillary sac, surrounds the lens of the early embryo. Its anterior segment then forms the papillary membrane, a vascular coat which is stretched immediately in front of the papillary aperture. By the gradual loss of its blood-vessels, this is converted into a simple transparent membrane, which disappears a few days after birth. The labyrinths are formed from the same vesicle, having a handle which is continuous with the brain. The vestibule, the cochlea, and the semicircular canals are then developed, at what is comparatively a very early date. The formation of the auditory ossicles is ultimately connected with the development of the most anterior part of the vertebral column. The cartilage which is developed in the upper part is in a day or two in a day or two. At this period the long process of the maleus extends on the first maxillary process, or the future lower jaw, as far as
to the median line; in the \textit{Mammalia}, however, it afterwards gradually disappears, so as to leave scarcely a trace. This trace is, however, generally recognized 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. These begin to develop, after the face, during the evolution of the face. The palate, 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 separately developed at the end of the second month, or the beginning of the third. It afterwards acquires its nails, together with its various glands and hairs.

In the advanced embryo, almost all the surface of the body is covered by a very fine down. The copious desquamation and fatty secretion of the skin result in a caisson substance, which covers many portions of the fetal body, and is capable of protecting it like an ointment from the injurious action of the liquor amnii.

Those primitive changes by which many of the embryonal organs commence, are effected without the aid of the vascular system. The heart subsequently begins as a tube, which, anteriorly, is continuous with centrifugal vessels or arteries; posteriorly, with centripetal tubes or veins. It afterwards undergoes a change by which it divides into the four chambers, produces the auricular appendages, and finally, presents two auricles and a single ventricle. The latter gradually acquires a septum, which is at first an incomplete, and finally a perfect one. These embryonal vessels gradually undergo numerous changes, and finally become divided only into the left and right branches, or morphosis of those organs of the body that are rich in vessels, but also to a variety of causes which belong to the vascular system itself.

The contrast of a systemic and a separate circulation obtained at a very early date. A great part of the surface of the yolk is at first covered by a vascular distribution, the aorta vasculosum, in which the blood of the embryo is changed by a process, the details of which are at present unknown. This part of the aorta vasculosum begins soon after the heart of the embryo has commenced to beat. In the \textit{Mammalia} it subsequently disappears, to make way for the placental circulation. The blood then runs through the umbilical arteries into the fetal placenta, where it undergoes a diffusion with the blood of the maternal placenta, returning to the fetus through the umbilical vein. The renovation thus produced corresponds, not only to the respiration of the more developed being, but also to the most pressing requirements of its nutritive processes.

The connection between the state of development of the heart and that of the great vessels, produces a peculiar movement of the blood which has been designated the foetal circulation, or the circulation of Sabatier. It is most distinct shortly after birth, when the placenta is still present. The blood of the right ventricle then passes chiefly into the lower half of the body and the placenta; while that which returns from this organ goes chiefly to the left heart, in order to flow thence to the head and neck, from which it finally returns to gain the right auricle and ventricle. So that there is a partial contrast between the circulations of the upper and lower halves of the body. After birth it is replaced by the systemic and pulmonic circulations.

The placental circulation ceases soon after birth, being replaced by the pulmonary on the respiration of air. But in the normal course of development the preparations necessary for this change are made some months before the end of pregnancy. Hence, under favourable circumstances, a child which comes into the world seven or eight months after conception may nevertheless continue to live.

The foramen ovale is due to the fact, that the inferior vena cava originally opens into the left auricle, and not into the right. The blood is gradually pushed over into the latter. This explains why the right auricle is at first the larger and that return of blood from the umbilical vein and the lower parts of the body passes into the left auricle during the foetal circulation. The groove which conducts it in this course is the relief of a special channel, the former caval groove. Immediately after the birth its functions having ceased when once the child has breathed.

By the foramen ovale is due to the fact that the heart and ductus arteriosus to the different parts of the body. In the embryo, the blood passes through the ductus arteriosus into the aorta; but after birth it becomes occluded. The superior and inferior vena cava then belong exclusively to the right auricle.
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 aorta to various parts of the body; some of it only goes 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 they are close together 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 short axis only five. This is the position in which the child remains throughout the whole of its nourishment, and very 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 process is not taken up by the lower forms of life of the vegetable kingdom. It has been proposed to consider all cases of oxidation in organic bodies as instances of respiration. Such an extension of the term has led to its application to plants as well as animals. It should however be remembered that the older physiologists applied the term Respiration to that function of plants by which they take up carbonic acid and give out oxygen, and which was regarded as an equivalent process to the taking up of oxygen and disengaging carbonic acid in animals. It was subsequently found that plants, during certain periods of the day, give out carbonic acid gas; and it was hence inferred that plants perform a function essentially the same as that effected in animals by the oxidation of carbon in respiration.

The animal, or man, who has been observed to consume oxygen and throw off carbonic acid are as follows:—1. During the growth of the order Funghi. 2. During the growth of the leafless parasites. 3. During night by most plants. 4. During the active growth of the Conifers. 5. During the flowering of most plants. 6. During the germination of plants. This process has been observed to be attended with the same results in certain of these cases, as in respiration of the higher animals, that is, with the disengagement of heat. When the process of oxidation takes place rapidly, disengagement of heat is the necessary result. That these plants perform a function in the vegetable kingdom is not a constant phenomenon, but only occurs occasionally in the life of the plant. It is during the latter stages of the growth of Funghi that it is observed, when it may be supposed that these plants are entering upon a stage of decay. The existence of the process is in agreement with the second respiratory laws, which unite readily with oxygen. Again, in the flowering of plants it is only an occasional and exceptional phenomenon in the life of the plant. The carbonic acid given out by plants at night can be quite as readily accounted for on the supposition that a certain amount of oxygen is respired, and the excess of carbonic acid taken up in the day has been undecomposed, and is given out at night, as on the theory of its being the result of oxidation. So likewise in germination, the carbonic acid produced as the result of a process of life in the young embryo, but of a process of decomposition going on in the stalk of the among which it is surrounded.

2. If the term Respiration is to be applied to the evolution of carbonic acid, and absorption of oxygen gas from the fluids of organic beings wherever found, then it must be used to comprehend the processes of fermentation, putrefaction, and emaciation, which take place either out of the structure or in the interior. The carbonic acid given off from food in the stomach or intestines of a human or animal has assuredly to be regarded as the result of respiration, yet this would be the case if we accepted a more chemical definition of respiration.

Respiration then appears to be a purely animal process, by which the fluids of the animal are brought into contact with the oxygen of the air, the final result of which is the discharge of carbonic acid gas. This process is continuous in the animal kingdom; and in the great majority of cases in the higher animals. When the animal dies, the processes of respiration ceases. When a animal dies from being deprived of oxygen gas, it is said to be suffocated. In the higher animals special organs are provided for the performance of this function. This function consists in the taking up of oxygen gas directly from the atmosphere, and allowing the carbonic acid to escape. Hence these arrangements have been called Organs of Respiration. It should however be understood that the chemical changes involved in the process of respiration are carried on in the tissues themselves. The lunge, 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 blood absorbs oxygen and disengages carbonic acid. The process of respiration than 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 referred, for the oxygenating the carbonic acid and 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 required for the combustion processes. 2. The removal of certain constituents which have been employed in nutrition, and destroyed during the performance of the function of the part. 3. The production of heat, arrangements for the accumulation of which are made in the higher animals, which are from this circumstance called warm-blooded. That the performance of one or other of these functions is essential to the life of animals is seen from the fact that, should the supply of oxygen to the tissues of an animal be limited or suspended, they exhibit deficient vitality or die. It is not on this account, however, that animals are not protected 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. With the lower animals, respiration of an animal is great it consumes more oxygen, and gives off more carbonic acid, than when it is small. Thus, in animals which hyperventilate, the amount of oxygen consumed, and carbonic acid given out, is much less during their period of repose than during their period of activity. Sluggish and slow-moving animals consume less oxygen than those which are active. Thus the Molusca 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 arrangement of the respiratory organs. In the lowest forms of animals, the Infusoria, the whole surface of the animal is 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 taken together, as in the sponges, and cavities or tubes, as seen in many of the polypaegric amebules and the sponges. Passing higher in the forms of animals, we find the method of introducing water into the interior of the animal becoming more complicated, till in the Holothurids we find a special system of vessels for supplying this fluid, which have been called an 'vascular' system, and which becomes more fully developed in the Echinids, 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 called blood, and which is carried in a circulating 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 aërating 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 Oyster, the Anemone, the Anemones, 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 expand uniformly and are carried on by air. During expansion, a certain quantity of air is taken into the lungs, and this act is called Inspiration. This expansion 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 movements of Inspiration and Expiration influence the circulation in 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, with an index attached, under the name of Sphygmometers, are now frequently employed as a means of diagnosis in diseases of the chest. The difficulty however of securing freedom from disturbing causes renders their results less to be depended on than could be wished. The quantity of air thrown out from the lungs has been variously estimated, and probably from 20 to 25 cubic inches is near the truth. Scharling conducted a series of experiments on the quantity of carbonic acid thrown out of the lungs by persons of different sexes 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>Weight</th>
<th>Carboxyl Acid</th>
<th>Grammas.</th>
<th>Grammes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>35</td>
<td>65-50</td>
<td>65-50 (in 1 hour) for each 1000 grammes' weight</td>
<td>33-600</td>
<td>0-6119</td>
</tr>
<tr>
<td>Youth</td>
<td>16</td>
<td>57-75</td>
<td>57-75 (in 1 hour) for each 1000 grammes' weight</td>
<td>34-200</td>
<td>0-5867</td>
</tr>
<tr>
<td>Soldier</td>
<td>20</td>
<td>62-00</td>
<td>62-00 (in 1 hour) for each 1000 grammes' weight</td>
<td>26-023</td>
<td>0-4466</td>
</tr>
<tr>
<td>Girl</td>
<td>17</td>
<td>55-75</td>
<td>55-75 (in 1 hour) for each 1000 grammes' weight</td>
<td>25-242</td>
<td>0-4546</td>
</tr>
<tr>
<td>Boy</td>
<td>9</td>
<td>22-00</td>
<td>22-00 (in 1 hour) for each 1000 grammes' weight</td>
<td>20-938</td>
<td>0-2245</td>
</tr>
<tr>
<td>Girl</td>
<td>10</td>
<td>23-00*</td>
<td>23-00 (in 1 hour) for each 1000 grammes' weight</td>
<td>19-162</td>
<td>0-3831</td>
</tr>
</tbody>
</table>

The air that is habitually and almost uniformly changed in breathing is Mr. Hutchinson socalled Fresh Air.

"The quantity over and above this which a man can draw into the lungs in the deepest inspiration he names Complemental Air; its amount is various, as will be presently shown. After ordinary expiration, such as that which expels the breathing air, a certain quantity remains in 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 there is no voluntary control 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 800 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, pain, and disease; and 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 72 degrees, and the height of a healthy person 5 feet 7 inches in height. For every inch of 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 stature holds true in all ages, but it is anticipated at the puberty 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 that of the legs, 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 decided. He says that 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 is diminished by 1/4 pound for every 161 lbs. 114 stones; but that above this point it is diminished at the rate of one cubic inch for every additional pound up to 196 lbs., or 14 stones; so that, for example, when a man of 5 feet 6 inches, and weighing less than 144 stones, should be able to expire 217 cubic inches, one of the same height, weighing 1/2 stones might expire only 303 cubic inches."

"By age the capacity appears to be increased from about the 15th to the 30th year, at the rate of five cubic inches for every ten years of life. It decreases after the 30th year, and the decrease is much more rapid after the 60th year. Mr. Hutchinson gives a cubic inch and a half per year, so that the capacity of respiration of a man 60 years old would be about 30 cubic inches less than that of a man 40 years old of the same height and weight."

"Mr. Hutchinson's observations were made almost exclusively on men, and his conclusions are perhaps true of them alone; for women, according to Bourgey, have only half the capacity of breathing that men of the same age have."

"It is well known that inspirations could be made by force usually ranges from 14 to 18 per minute. According to Mr. Hutchinson, the force with which the inspiratory muscles are capable of acting is greatest in individuals of the height of from 5 feet 7 inches to 6 feet 6 inches, and will elevate a column of mercury of 15 inches. After this the force decreases as the stature increases, so that the average of men of 6 feet can elevate only about 2 inches of mercury. The force manifested in the strongest expiratory act, on the average, one-third greater than that exhibited in inspiration; but this difference is in great measure due to the power exerted by the elastic reaction of the walls of the chest, and it is also much influenced by the disproportions of the chest which the inspiratory muscles attain through being called into use for their purpose of respiration. 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 of air forced through the lungs of a person at his known capacity of respiration during life; and he calculated 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 as 1 to 2, or at least as 1 to 3; and in a state of tranquil respiration, supposing the amount of breathing at 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
greater than enough to lift this weight; because in it the elastic force of the lungs is also in action—a force which is not included in these estimates, because the lungs were in both cases burst by the air forced into them." (Kirkes and Page, ‘Handbook of Physiology.’)

The changes of the air in the lungs effected by the respiratory movements are assisted by the air itself. It is a well-known fact that carbonic acid, although heavier than atmospheric air, is perfectly dispersed through the air, and diffused into the lungs, and that it is taken up without difficulty of the diffusion of gases. There is no doubt that this law is in active operation during the respiratory changes, and that it assists the oxygen in passing into the lungs, and the carbonic acid in passing out. If it were not for this interchange the reserve and residual air would probably be injudiciously charged with carbonic acid. It is also probable that the difference of temperature within and without the lungs assists in the interchange of the air.

The air which is taken into the lungs during respiration is the air of the atmosphere, which in round numbers consists of 31 of oxygen, and 79 of nitrogen in every 100 parts. A small proportion of carbonic acid exists in it, about 4 parts in 10,000. It also contains a varying quantity of watery vapour. The changes which occur in this air during respiration are: 1. It contains a larger quantity of carbonic acid gas. 2. Its oxygen is diminished. 3. Its watery vapour is increased.

An easy proof of the existence of carbonic acid in the air expired by the lungs, is afforded by blowing through a tube into lime water, when the carbonic acid will unite with the lime, and carbonate of lime will be precipitated. The quantity of this gas which is calculated by Calvett and Brunner, as thrown out from the lungs in 24 hours, is 1345.5 cubic centimeters, or about 6264 grains an hour. This would make about 1753 grains of carbon in an hour, or 8 ounces in the 24 hours. Andral and Guavarot calculated the quantity at 9 ounces, and Mr. Coshupe at 5 ounces. Liebig gives 12 ounces as the quantity of carbon thrown off from both the skin and lungs.

The quantity of carbon however which is thrown out from the lungs varies under different circumstances. As is seen in the preceding table, sex and age make a considerable difference in the quantity of carbon expired.

Diet exercises a considerable influence on the quantity of carbon thrown out from the lungs. The following table exhibits the quantity of oxygen required by certain articles of diet to convert them into carbonic acid and water. It should always be recollected in relation to this subject, that although carbon is spoken of so frequently, not only is carbon oxidized, but also hydrogen. Wherever hydrogen is present in the tissues, it sustains apparently the same relation to oxygen as carbon. Hence, in the calculation of the influence of diet on respiration it should never be left out—

<table>
<thead>
<tr>
<th>Substance</th>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 parts of Fat</td>
<td>78.18</td>
<td>21.82</td>
<td>10.13</td>
</tr>
<tr>
<td>Starch</td>
<td>44.45</td>
<td>6.15</td>
<td>49.38</td>
</tr>
<tr>
<td>(C4, CH, OH)</td>
<td>40.00</td>
<td>6.66</td>
<td>53.34</td>
</tr>
<tr>
<td>Colloids</td>
<td>47.48</td>
<td>4.52</td>
<td>53.34</td>
</tr>
<tr>
<td>Muscular substance</td>
<td>42.92</td>
<td>4.47</td>
<td>53.55</td>
</tr>
<tr>
<td>Pigment</td>
<td>41.14</td>
<td>4.66</td>
<td>53.55</td>
</tr>
<tr>
<td>Fibrous and Collagen (Schmidt)</td>
<td>40.10</td>
<td>4.72</td>
<td>53.66</td>
</tr>
<tr>
<td>In 1000 grammes' weight of Eggs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gramm.</td>
<td>Gramm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From the 9th to the 14th day of Infection</td>
<td>26.26</td>
<td>41.73</td>
<td></td>
</tr>
<tr>
<td>The loss of weight amounted to</td>
<td>5.74</td>
<td>10.70</td>
<td></td>
</tr>
<tr>
<td>The absorbed oxygen</td>
<td>4.33</td>
<td>11.92</td>
<td></td>
</tr>
<tr>
<td>The exhaled carbonic acid</td>
<td>2.68</td>
<td>4.66</td>
<td></td>
</tr>
<tr>
<td>The ratio of absorbed O to the O in C4 or</td>
<td>100</td>
<td>54.9</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>100</td>
<td>81.0</td>
<td></td>
</tr>
</tbody>
</table>

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 remains possible that this might work 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, it may be stated as a general rule 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 being expired; 3. By the temperature of the expired air; 4. By the length of time 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
dependent for their existence on the influence of the nervous system. All the respiratory movements effected by the muscular tissues, as far as they are independent of the consciousness of the individual, are under the absolute governance of that part of the brain which is called the medulla oblongata. It is this portion of the nervous system which acts as the centre of all the impressions which convey the necessity of breathing, and which initiates all the motions which result in respiratory action.

(Kirkes and Paget, Handbook of Physiology; Lehmann, Physical Chemical, translated for the Cavendish Society by Dr. Day; Valentin, Text-Book of Physiology, translated by Dr. Brinton.)

<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>£52,124.47</td>
<td>£52,656.29</td>
<td>...</td>
<td>441.82</td>
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<tr>
<td>1839</td>
<td>£55,083.349</td>
<td>£54,440.367</td>
<td>...</td>
<td>£643.98</td>
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<tr>
<td>1840</td>
<td>£47,567.565</td>
<td>£49,101.265</td>
<td>1,545,271</td>
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</tr>
<tr>
<td>1841</td>
<td>£48,084.359</td>
<td>£50,185.729</td>
<td>2,101,570</td>
<td>5,979,555</td>
</tr>
<tr>
<td>1842</td>
<td>£46,936.830</td>
<td>£50,545.109</td>
<td>3,578,926</td>
<td>4,289,060</td>
</tr>
<tr>
<td>1843</td>
<td>£54,005.253</td>
<td>£50,647.684</td>
<td>3,556,185</td>
<td>8,361,743</td>
</tr>
<tr>
<td>1844</td>
<td>£63,060.584</td>
<td>£49,242,713</td>
<td>8,245,888</td>
<td>2,989,955</td>
</tr>
<tr>
<td>1845</td>
<td>£51,645.564</td>
<td>£46,924.364</td>
<td>1,443,504</td>
<td>29,566,364</td>
</tr>
<tr>
<td>1846</td>
<td>£53,306.717</td>
<td>£48,185.136</td>
<td>...</td>
<td>796,419</td>
</tr>
<tr>
<td>1847</td>
<td>£56,251,749</td>
<td>£50,635,223</td>
<td>2,067,165</td>
<td>...</td>
</tr>
<tr>
<td>1848</td>
<td>£51,010,600</td>
<td>£52,231,874</td>
<td>2,278,966</td>
<td>2,287,866</td>
</tr>
<tr>
<td>1849</td>
<td>£53,233,006</td>
<td>£50,566,010</td>
<td>2,726,296</td>
<td>...</td>
</tr>
<tr>
<td>1850</td>
<td>£52,216,071</td>
<td>£50,732,512</td>
<td>1,475,559</td>
<td>2,358,503</td>
</tr>
<tr>
<td>1851</td>
<td>£44,530,544</td>
<td>£48,174,263</td>
<td>3,649,212</td>
<td>8,299,059</td>
</tr>
<tr>
<td>1852</td>
<td>£63,364,605</td>
<td>£48,505,788</td>
<td>21,141,183</td>
<td>...</td>
</tr>
<tr>
<td>1853</td>
<td>£72,218,988</td>
<td>£68,228,400</td>
<td>10,191,413</td>
<td>...</td>
</tr>
</tbody>
</table>

In 1852 the revenue amounted to £70,909,343, from the following sources:

- Customs 22,464,354
- Excise 7,472,202
- Stamps 3,049,224
- Tobacco (land and assessed) 15,137,996
- Property tax 2,892,000
- Post Office 2,734,000
- Customs (foreign trade) 97,674
- Produce of sale of old stores, &c., 11,922,004
- Money received from East India Company 60,000
- Interest and other moneys 407,957
- Unclaimed dividends received 87,134

The expenditure was—

- Interest and management of permanent debt 23,626,907
- Unclaimed dividends paid 88,531
- Terminable annuities 3,979,136
- Interest on Exchequer Bonds and Bills 988,616
- Civil List 401,479
- Annuities and pensions 337,028
- Salaries and fees, &c., to public servants 110,573
- Diplomatic salaries and pensions 155,569
- Courts of justice 576,421
- Miscellaneous charges on Consolidated Fund 177,017
- Compensation for abolition of Slave Trade 1,121,203
- Army 13,611,576
- Navy 10,590,000
- Pacific expedition 5,680,000
- Expenses of war in China 599,695
- Miscellaneous civil services 6,005,456
- Salaries, &c., of revenue departments 4,384,298
- Redemption of Exchequer Bonds 2,000,000

70,354,246

The salaries of the Revenue Department form a separate charge, and are no longer deducted as charges of collection before transmission to the Exchequer, and are consequently subject to parliamentary supervision.

The National Debt, funded and unfunded, at the end of 1852, was £605,282,699, of which £21,555,416 had been created in 1846. In addition to the sums shown as excess of income 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, certain Bank Annuities, and Three per Cent. Annuities, were incorporated with the National Debt on terms which involved 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 defalcation in the revenue. It was assessed at £7d. in the pound on all incomes of 10l. a year and upwards. Its effects were visible in 1843, and enabled him to make extensive reductions in the custom and excise duties, to the great benefit of the commerce of the country, as well as the comfort of the inhabitants.

The excise duties necessarily interfere with the processes of manufacture—are unavoidably iniquitous—and are a check upon improvement. In 1797, not fewer than 2 articles were subject to duties of excise. The list includes salt, wine, behaviour, bread, clothing, and skins of the good, candles, bricks and tiles, starch, soap, stone bottles, sweets and meat, and auctions and glass. There were separate

The expenditure for the same year was £51,319,192, under the following heads:

- Charges of collection and other payments before reaching the Exchequer 4,189,159
- Interest and management of National Debt 24,357,137
- Terminable annuities 4,915,745
- Interest on Exchequer Bills and Notes 936,688
- Civil List 444,068
- Annuities on pensions charged on Consolidated Fund 578,966
- Salaries and allowances 194,042
- Diplomatic salaries and pensions 181,140
- Courts of fees 674,432
- Miscellaneous charges on Consolidated Fund 331,788
- Army 6,201,716
- Navy 4,705,688
- Ordnance 1,444,924
- Miscellaneous charges on annual grants of Parliament 2,513,029

50,592,446

Showing an excess of expenditure over income of £736,466. The burden of the public funded debt, on Jan. 5, 1852, was £704,705,037.

The following table gives the results from 1838 to 1852:—
Boards of Excise for England, Scotland, and Ireland, the functions of which were discharged by 23 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 51. While the board interferes during the process of growth 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. In 1858, when the most conscientious respect for the law rendered it difficult at all times to avoid infringement 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 written order of the Board, acting under the terms of imprescriptible and complicated rules which he was compelled to observe in carrying on his business.

In the department of the customs the practical reforms effected by government continued. At the time laws relating to customs were contained in no fewer than 1600 Acts of Parliament. In 1833 they were consolidated in a plain, simple, and intelligible form under one statute. At the same time the whole of the customs duties of the United Kingdom were enumerated. The Consolidated Act of 1846 is arranged alphabetically. The Consolidated Act of Customs Regulations and the Consolidated Tariff Act are all that the merchant will now require for his guidance in place of hundreds of labyrinthine Acts which these two simple codes replace.

In 1815 five years were required to effect a digest of the customs laws into 1376 pages; and in 1826 the work of consolidation was compressed into eleven separate acts, the first of which repealed 443 statutes, many of which had been obsolete, and enumerated 1110 different rates of duty chargeable on imported articles; and yet, in 1839, nearly 99 per cent. of the customs duty was contributed by 46 articles. In 1840 there were 1053 articles subject to the duties charged, of which the number in 1845 was 1842, and in 1853 the number was 469, and in 1853 the duty was entirely repealed on no fewer than 105 articles, so that, since 1845 the number of articles on which customs duties are levied has been reduced from 1053 to about 390. In 1866, however, there were 232 articles charged, and one of which amounted to 10,000l. in the year, and some producing the most insignificant sums; such as almond paste, 2l.; barley, pearled. 4l.; essence of spruce, 1l.; nux vomica, and oil of almonds, 2l. each. The whole yearly produce of the Excise is 5,000,000l. In the seventeenth century, from 1860 to 1867, the amount of customs duties reduced or repealed has amounted to upwards of 10,000,000l., while the amount collected has increased from 5,000,000l. to 13,500,000l. The methods, system, and situation of the Excise have been improved, and the necessity of allowing drawbacks on soap used in certain textile manufactures 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 raising 1d. 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 1855, by advancing the duty on the excise to 8d. in the gallon. This measure at once relieved the borders from a block to a multitude 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, 1858, Mr. Disraeli, the 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 income-tax, and to accustom the Irish mind to the idea of the Exchequer being willing to make a great sacrifice. He remitted a sum of 4,500,000l. due from Ireland to England, constituting an annual charge of 245,000l., four-thirds of which was to be continued for forty years. He swept away this debt, and committed the charge in consideration of an addition of 8d. per gallon on Irish spirits, and the income-tax for seven years. Ireland had been exempted...
from this tax in 1845, in consideration of a duty of 1s. additional on spirits, and an augmentation of stamp-duties; but the first was abandoned almost as soon as enacted, and the second disappeared in 1850, when a reduction of stamp-duties took place both in this country and Ireland. Exemption from the tax, however, was still conceded to the income-tax or the revenue; as, for example, Great Britain had borne the income-tax, and Ireland had largely participated in the remission of duties which that tax was designed to supply. When, therefore, further benefits were to be placed within reach by assenting to the income-tax for a period of seven years, it was felt to be just in 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 separate acts of Parliament, was replaced with one 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 the penny receipt-stamps to be used in connection with bankers' cheques, so as to add to their security. [Stamps, S. 2.]

The most important portion of the Budget of 1853 was undoubtedly the new tax on successions, which subjects every succession to a tax from Great Britain of 5 per cent. From 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, which was assessed by the Inland Revenue, had been exempt from legacy duty. This feudal claim of exemption permitted an estate in land of 50,000L. a year to pass to the heir without his contributing one farthing to the state, while a poor man who received a legacy of 100L. paid a tax of 10L. The anomaly has now ceased, and a person who succeeds to a landed estate of 10,000L. is taxed on the annual value of his property, which, on the principle of calculation adopted, gives a rent of 300L. a year.

The income-tax was retained, but was associated with remissions of indirect taxation to an amount exceeding 5,000,000L.; and its extinction was finally provided for in 1860, on the ground that it is 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 general 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.

During the years which lasted, with two brief intervals, from 1792 to 1815, 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. From 1793 to 1796 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 36,000,000L. a year. The revenue, with all the additional taxes laid on, amounted to 20,500,000L., leaving an annual deficiency of 15,400,000L.

In 1798, the income-tax was imposed by Mr. Pitt, and from 1799 to 1803, the cost of war and public charges rose from 37,904,000L. to 47,327,000L., the revenue, aided by the income-tax, rose from 20,500,000L. to 33,700,000L., and the annual increase of expenditure, amounting to 11,400,000L., a year, the excess of expenditure over revenue was less by 2,000,000L. a year during these four years than from 1793 to 1798. From 1803 to 1815, the income-tax was in full force. The expenses of the war and of government, and the charge of debt (9,500,000L.) incurred before 1793, amounted to 65,794,000L., but the revenue rose to 63,700,000L. The annual deficiency, instead of being 18,400,000L., as in the first period, or 11,400,000L., as in 1798, was only 1,200,000L. Omitting the charge of debt incurred before 1793, there was actually raised, during the heaviest period of war expenditure, 7,000,000L. a year more than the charge of the war, as against the want of war.

If the resolution to submit to an income-tax had not 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 re-imposing 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 so to make it a tax not on personal but on productive income; 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 nature and circumstances of the state of the nation, to the duration of the tax, and staked their official existence on 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 was altogether unable to say whether the tax was a tax on 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 145,590L.; a jury awarded 26,973L., but their return of profits for assessment to the income-tax was only 9,000L. The case of the professions, which has often been brought forward as one of peculiar hardship, appears when analysed to be of less magnitude than the public have been led to believe. They do not contribute more than one-twentieth part of the tax; but to mitigate their case as far as possible, persons who insure their lives up to one-sixth of their income for ten years are released from taxation. They are not required to take out an insurance, but not so as to escape the tax altogether; and this will chiefly benefit the professions to the amount probably of 120,000L. a year.

The remission of the income-tax to Ireland has already been noticed. The tax has also been extended at a lower rate of assessment to all persons with incomes between 100L. and 100L. a year. They were benefited by all the remissions of taxation, which had been purchased at the cost of others by the payment of the tax. In 1846 further remissions were to be made, it was only just that this exemption should cease. The Chancellor of the Exchequer added cases showing, that persons with incomes between 100L. and 100L. a year, had been benefited by the reduction of duties on necessaries and luxuries to a greater extent than whose incomes varied from 160L. to 170L. a year; the first to the extent of 6 and 7 per cent., and the second to only 5 per cent., or deducting the payment by them of income-tax of 2 per cent. On the other hand, the cost of the tax in Russia, the tax was raised to 16d. in the pound on incomes of 150L. and upwards, and to 11d. on farms rented 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 tax to the financial principal 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 great benefits when released from taxation to be productive of the greatest advantages to the community. The advantages 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 impolicy. 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.

Much has 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 most able speech on introducing the Budget in April, 1853, as a fair statement of the principle which now regulates the fiscal system: "While we have sought to do justice, by 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 the principle of taxation by the payment of the tax guided by any desire to put one class against another; 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 classes, and claim for ourselves 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 they are happy 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:

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Repealed or Reduced</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>£18,959</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£1,258,959</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1856</td>
<td>Customs</td>
<td>£589,544</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1857</td>
<td>Window glass</td>
<td>£2,053</td>
</tr>
<tr>
<td></td>
<td>Cautionary manufacture</td>
<td>£6,000</td>
</tr>
<tr>
<td>Carry forward</td>
<td></td>
<td>£8,057</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1858</td>
<td>Income tax reduced</td>
<td>£1,925,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1859</td>
<td>Bristol forward</td>
<td>£8,057</td>
</tr>
<tr>
<td></td>
<td>Brought forward</td>
<td>£1,428</td>
</tr>
<tr>
<td></td>
<td>Spruce Beer</td>
<td>£8,057</td>
</tr>
<tr>
<td></td>
<td>Plums</td>
<td>£1,896</td>
</tr>
<tr>
<td></td>
<td>Other articles</td>
<td>£161</td>
</tr>
<tr>
<td>Excise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malt</td>
<td>War Tax</td>
<td>£2,000,000</td>
</tr>
<tr>
<td>Carry forward</td>
<td></td>
<td>£2,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>Customs 5 per cent.</td>
<td>£1,060,529</td>
</tr>
<tr>
<td>Excise 5 per cent.</td>
<td></td>
<td>£438,000</td>
</tr>
<tr>
<td>Ditto spirits</td>
<td></td>
<td>£344,000</td>
</tr>
<tr>
<td>Assessed taxes</td>
<td></td>
<td>£311,477</td>
</tr>
<tr>
<td>Postage, abolition of franking</td>
<td></td>
<td>£118,667</td>
</tr>
<tr>
<td>Other taxes</td>
<td></td>
<td>£1,570</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£2,974,240</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>None.</td>
<td>£440,643</td>
</tr>
<tr>
<td>Income and property tax</td>
<td></td>
<td>£5,100,000</td>
</tr>
<tr>
<td>Export duty on coal</td>
<td></td>
<td>£141,290</td>
</tr>
<tr>
<td>Spirits, Ireland</td>
<td></td>
<td>£240,000</td>
</tr>
<tr>
<td>Stamps, Ireland</td>
<td></td>
<td>£121,745</td>
</tr>
<tr>
<td>Other taxes</td>
<td></td>
<td>£36,314</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£5,929,989</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Taxes Imposed or Increased</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>Butter &amp; cheese</td>
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REVIVOR. [Socr Faciis, S. 2.]

RHAYADER. [RANDOMBER.]

RHENEITE. [MINEALOGY, S.1.]

RHINOPOMA. [CHRYSTOPTA.]

RHIZANTHE. Rhizants, Rhizogons, a small class of Plants, comprising the orders Balanophoraceae, Gymnaceae, and Rafflesiacae. They are parasitical plants, destitute of true leaves, in place of which they are furnished with cellular scales. Their stem is either an amorphous, fleshy, 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 colour, 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 mycellial stem, parasitic habits, and cellular structure ally them with the Fungh and other low forms of vegetation. Mr. Brown however is of opinion that the Rhizantes are but less developed forms of Exogenous Plants. He regards them as having affinities with Aristolochiacae, and other orders of Exogens. More recently Mr. Griffiths has adopted the views of Brown, and advanced
a number of arguments in favour of their being degraded forms of higher plants, and not a permanently low form of vegetation. He thinks the relations of Rhizantha various. Thus he places Mystropetalon near Protaceae and Santalaceae; Sarcoptolepis and Balanophora he places near Urticaceae. Finally, he places Thesium between Taccaceae and Burmanniaceae.

The following are the orders of Rhizanthae as recognised by Lindley:—

Ovules solitary, pendulous; fruit one-seeded; 
Balanophoraceae.

Ovules 00, parietal; fruit many-seeded; 
Calyx 2-4-6-parted; anthers opening by slits.

Cytinaceae.

Ovules 00, parietal; fruit many-seeded; 
Calyx 5-parted; anthers opening by pores.

Rafflesiaceae.

RHIZOBOLACEAE, Rhizobolus, a natural order of Plants, consisting of trees of very large size. 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 aestivation; petals 5 to 6, equal-sided, but unequal thickish, arising along with the stamens from a hypogynous disc; fruit of several combined indistinctly one-seeded nuts; seed reniform, exalbuminous, covered with a spongy excrecence; radicle very large. The species are confined to South America. They are large timber-trees, some of which yield edible oil. It is from trees of this order that are produced the Soanai (or Suawar) Nuts of the shops, the kernel of which is one of the most delicious fruits of the nut kind that is known. An oil is extracted from them not inferior to that of the olive. The timber of the tree is used for ship-building.

(Lindley, Vegetable Kingdom.)

RHIZOBIACEAE. [Mabberley, s. 2.]

RHIZOPHERACEAE. [Buisson.] RHIZODITA, A Mineral resembling Boracite [Borax] in its crystals, but it tingles the blow-pipe flame deep red. It occurs with the Red Tourmaline of Siberia. (Dana.)

RHODYMENIACEAE, 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 double; cotyledons external or half-timbered, thick globose or hemispherical, imperforate, containing beneath a thick pericarp a mass of spores affixed to a central placenta. The root is disc-like or branched, somewhat matted; from the frond arise many stems, either leafy or filiform, and much branched, never articulate; in some an intense scarlet, in others, in brown-red or purple, usually growing somewhat darker in drying. The species are very few and very difficult; all our genera having representatives in very distant countries and climates. Rhodymenia 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 splendid and showy of our seaweeds, and among them, as R. Hombrowniana, are clothed in royal purple; while others, like the sober dulse of our coasts, R. palmata, 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 Dulse of our coasts, is collected largely in Scotland and Ireland, and forms an important article of diet. Many of the Gracilariae are largely used in the East as ingredients in soups and jellies, and as substitutes for glue. One of them G. 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 glues. It has recently been imported into England, and is occasionally used instead of carrageen moss in making jellies and blanccmanges.

(Harvey, British Alga.) RHYDDLLAN, or RHUDDLLAN. [Fluntshire.] RHYTHM, [vars.]

RICCIACEAE, a natural order of Moss-like Plants or Herbs, inhabiting mud or water, swimming or floating, usually annual; their leaves and stems blended into a front of a cellular structure, creeping, green or purple underneath, with a distinct epitropous, and a cavity of air-passages beneath it in some species.

These plants form a plain transition from Thallogena to Acrogyros. Their spores are collected in large numbers within organs resembling the piliils of Phaeogamous Plants. They may be fixed by the axis of growth, and an epidermis is distinctly formed with stomates for breathing with. The genus Duriaea is regarded as forming the nearest transition to Liverworts. It fructifies under water, which is very seldom the case with the other Cryptogams.

Of the species of Ricciaceae there are two-thirds that 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 Brazil, appear to be very similar to those of Europe, but differ in genera and 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 57 miles S.W. from Winchester, 92 miles S.W. by way of Salisbury, and 17 miles from the W. road, and 40 miles N. from Southampton and South-Western railway. The population of Ringwood parish in 1851 was 3928. The living is a vicarage in the archdeaconship and diocese of Winchester. Ringwood Poor-Law Union contains 45 parishes, and township and female at the expense of of 16,425 acres, and a population in 1851 of 5465. 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 1320; the nave and 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. Richmond is the nearest market, and can be reached by road, and by the railway from the west. The most eminient 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 Edinburgh, and was availed himself of the opportunities afforded by the grammar-schools of Scotland to acquire a well-grounded education. His first known entry into public life was as 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. He made a very considerable impression on 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 architect of the constitution and the close corporation of the town; the advocate for the improvement of the burgh schools; for the extension of harbour accommodation; and the expounder of fiscal mismanagement. About 1825 his connection with the 'Dundee Advertiser' was terminated, but he was not disposed to give up the field. With friends he commenced 'The Spectator,' of which he was absolute control, and of which the first number was issued on July 5, 1825. He had now an opportunity
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 sub-
jects himself, he secured the services of a number of
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 the
greater freedom of political discussion, of the timely
establishment, and probably few newspapers have had
so much influence in forming opinions, particularly among
the more highly educated class, as 'The Spectator.' The
freedom which was given to criticising the king, his
excesses; the absence of all exaggeration or deprecation of facts; 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
indifference, aided the influence by exciting thought.
For thirty years he continued this laborsious and useful life up to
within a month of his death, which occurred on April 29,
1765.

RIOJA, LA, one of the provinces of the Argentine
Confederation, comprehends the country between the Gran
Salinas 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. and W. by Cat-
umarens, and on the E. by the republic of Chili. The area is
5850 square miles. The population is variously estimated
from 15,000 to 25,000.

The country is described generally under PLATA, LA,
STATES OF. It consists of a narrow strip of cultivable land
along the eastern base of the Andes, the two valleys of Fatamansa and Guadacual, 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 Fatamansa are fit for agriculture. The province is bounded N. by the province of Arauco, W. by the provinces of Arauco, Fatamansa, Guadacual, and the Llalao of Arauco lies east of the Sierra de Velasco, and produces wheat, maize, and cotton; but its principal wealth is its vineyard. From 7000 to 10000 barrels, of 16 gallons each, of a strong sweet wine, called Chilenio, is produced. The city of Fatamansa is on the whole of which is exported to Cordova and the neighboring provinces.

The capital, La Rioja, is also that of the whole province. Fatamansa lies to the west of Arauco, between the Sierra de Velasco and the Sierra Fatamansa. It contains rich deposits of coal, and is one of the most important of the 13 towns of the province. About 6000 barrels of wine annually. This department takes its name from the Sierra Fatamansa, celebrated for its mineral wealth. The silver-mines of Fatamansa are very rich, but the remoteness and insecurity of their situation—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, Chilecto,
is a place of no importance. Goitre prevails to a fearful
tensity in the valley of Fatamansa. Guadacual lies between the
Sierra Fatamansa and the Andes, and produces very rich
crops of wheat. It is thinly inhabited, and chiefly by abori-
gines, who hunt the vicuna in the adjacent mountains. The
wool of the vicuna is the only article of export. Guadacual,
though not exactly a port, is a central place of the province,
consisting chiefly of a desert plain, containing a great number
of grassy oases, 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
under national, owning a qualified dependence upon 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 Cordillera, and contains the usual suburban
buildings. It contains some substantial houses, a few public buildings,
the only school in the province, and about 3000 inhabitants.

RIPLEY. [Yorkshire.]
ROCAMBOLE [Alicante.]
ROCABRULAC ACID. [Chemistry. S.1]
ROCHEA (named after La Roche, a French Botanist), a
genuse of Plants belonging to the natural order Crassulaceae.

It has a 5-lobed calyx; petals 5, united into a gamopetalous
hypocephalous corolla, 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 fleshy simple succulent shrubs. The leaves
are thin, oblong, acute, ciliate at the base, thin, and white. The
flowers are disposed in terminal corymbs, without any bracts.
A large number of the species are cultivated in our gardens and
greenhouses.

ROGER WILLIAM SAMUEL, was born on the 30th of July 1763,
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
hands of the house of Humphrey Bonham, who, for a time, was
his partner. Among the reminiscences of this time was that
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 to date
his first determination towards poetry from the effect pro-
duced upon him by reading Beattie's 'Minstrel' when a mere
boy. His admiration of literature and literary men led him,
who still a clerk in his father's bank, to meditate a call on
Dr. Johnson. On one occasion, when his friend, Dr. Bonham,
met 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
1783 that Roger, then in his twenty-third year, published his first volume of
poetry 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 ex-
actly with the publication of this volume, which appeared before 1783, the
years in which there had been manifestations of a new poetic spirit, differing from
that of the poetry of the 18th century as a whole, and more
particularly from that of Darwin, Hayley, and the Della
Cruccas, who represented the poetry of the 18th century in
its latest and greatest manifestations.' Roger himself, who pub-
lished his 'Library' in 1781; and Cowper had made his first
distinct appearance as a poet in 1782, when he was already
in his fifty-second year. Crabbé's 'Village' was published
in 1783, and Cowper first made an effective impression the
year before 1783, in 1782, in the second volume of his
great work, in which he published his 'Task,' in 1785.

Thus Rogers was heard of as a poet almost at the
same time as Crabbé and Cowper. But more exactly con-
temporary with Rogers than either Crabbé or Cowper was
the poet Campbell, whose 'Ode to Mary, Countess of
Exceter,' was published in 1783. The following year, of 1785,
that year, 1785, which saw Rogers's 'Library as 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. Although Rogers died very young, he lived long enough
in France, where he saw Condercot and many other men after-
wards celebrated in the French Revolution. He also visited
Scotland, where he saw Adam Smith, Dr. Robertson, and
William Robertson, in 1768. His own critical sentiments
were those of moderate Whiggism, but this did not prevent
men of all parties from being his guests.
In 1812, Rogers, when his name seemed dead, added to a republication of his earlier poems, the fragment entitled "Columbus." He was then in his fiftieth year. 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 skill as the other poems," it was pronounced "of the highest 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 sixty-sixth year, and the complete edition of which, illustrated, under the author's care, at an expense of 10,000l. by Stothard, Proot, and Turner, did not appear till 1836. With the preparation of this exquisite book his literary career may be said to have ended; he was still the author of occasional copy of verses at the rate of a couple a week; and some of these 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 supernumerary poet, living on the reputation 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 the public was least of all enlightened in the disjointed history of his last twenty 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 the fashionable quarters of the city, or lounging at the opera, to within a few years of his death. An accident in the streets at last disabled him from walking out; but the extraordinary tenacity of his constitution enabled him to recover from it, when a second stroke of paralysis seized 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 obscure lines; fine cabinet pictures of soft and mellow hues, and occasionally trains of thought and association that awaken or recall tender and heroic feelings." His relations to his time were less those of active influence than of broad and genial remembrance. They are best exhibited in the "Table Talk," published since his death, by his friend Mr. Dyce.

ROME. [MINERALOGY. S. 1.] ROSE-WOOD. [TRIPTOCOLIA. S. 2.]

ROSE, REAR-ADMIRAL SIR JOHN, Knight, was born June 24, 1777, at Balsaroch, Wigtownshire, Scotland. He was the fourth son of the Rev. Andrew Ross, of Balsaroch, minister of the parish of Inch. He entered the navy as a first-class volunteer November 11, 1790, on board the Prince, 22 guns, and served in the Mediterranean till 1799. From November 7, 1790 till 1791, he served on board the Impregnable, 98 guns, in the English Channel. After being some years in the Baltic, in 1802 he became a midshipman on board the Wessel, sloop-of-war, which in 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 Sirius, 16 guns, in 1806, he was severely wounded in four places in cutting out a Spanish vessel under the batteries of Bilbao, for which, in 1806, he was granted a pension of 924l. a year, increased in 1815 to 125l. a year. He was several times of commission, and was appointed to the Brises, sloop-of-war, and afterwards to other vessels, till the termination of the war in 1815, during which period he performed several services. He married his first wife in 1816.

In 1820 he married Miss Fanny, daughter of Captain Driver, sloop-of-war, in Loch Ryan, on the coast of Scotland, he received a copy of 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 a north-west passage;" 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 13th of January 1818, he was ordered on board the 385 tons, Lieutenant 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 returned by the other side. They entered Lancaster Sound, and after proceeding some distance up it, Ross and the officer of the watch thought that they saw "land round the bottom of the bay, forming a chain of mountains connected with those which extended along the north coast. The height of the supposed slow-moving vessel, was a considerable distance behind the Isabellas. Parry however and his officers could see no mountains, and were greatly surprised and disappointed when the Isabellas turned her head eastwards, and gave the signal for the 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 it was a passage opening into the sea; and the latter entered through Lancaster Sound into Barrow's Strait. [Parry, Sir William Edward, S. 2. The ships arrived in the Thames on the 14th of November, 1818. On the 7th of December, the same year, Ross was sent north, as captain of his Majesty's sloop-of-war, A Voyage of Discovery, made under the Orders of the Admiralty, in his Majesty's ship Isabella and Alexander, for the purpose of exploring Baffin's Bay, and enquiring into the Probability of a North-West Passage, 2 vol. 8vo.]

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 undertook to equip the vessel, and Captain Ross undertook to command the expedition. A new 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 by Mr. Brown of Mears, Braham, and Co., 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 burthen, granted to them by the Admiralty, and undertook to bear the expenses of the expedition. They had a steam-ship, the British Victory, of 100 tons burthen, and a steam vessel, H.M.S. Fury, had been wrecked. The Victory and the Krusenstern entered the Inlet on the 12th of August, and on the following day discovered the wreck of the Fury. They afterwards proceeded south, as they returned, along the coast of Asia, and on the 8th of October were frozen up in Felix Harbou, on the west side of the Gulf of Bouchia. They were not released from the ice till the 17th of September 1830, and were able to advance but a very short distance before they were again frozen up on the 31st of October. On the 29th 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, they sailed into Kuskokwim Bay with sledges and provisions, and on the 29th of May the vessels were finally abandoned. Captain Ross, in his journal, observes, "In the evening I took my own adieu of the Victory. It was the first vessel that I had ever been obliged to abandon, after having served about his majesty's service in the course 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 return to the coast of Asia. On the 17th of October, after the entrance of Lancaster Sound, they came in sight of the Isabellas, which was out on a whaling voyage. The mate in command of a boat that was sent to them, on Captain Ross asking him the name of the vessel, said it was the Isabellas. On the 18th of October, they came in sight of the Unashaws 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 received on board the Isabella, with the bones and inscriptions, 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.

Most of the bones were frozen up in the Gulf of Boothia, many journeys and surveys were made by Commander Ross, and some by Captain Ross himself, chief of the coast and the country which they named Boothia Felix. During one of these journeys Commander Ross discovered, June 1, 1831, a species of Plane which bore the name of Plane 'Celebrated,' which has the name of Plane 'Celebrated,' and which was not published, and which was not published.

The ship, which was one of the little case or tube, in which they live, but this must not be confounded with their proper envelope. When the loria is soft the animal has considerable power of elongating and contracting its body, as seen in the cuticular tube or tube, which is connected with 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 or extended, or both, and which are fixed to the tegumentary system, and also to that part of the digestive system connected with the rotatory organs. The Ehrenberg has given the name of 'gills.' This system of vessels is regarded by Mr. Huxley and other observers as a true squeruous or water-vascular system. Connected with the respiratory apparatus, according to Ehrenberg, is an organ projecting out into the water, which has been called the 'calcar,' or 'siphon,' or ' respiratory tube.' Ehrenberg describes it as a tube, and supposes currents to pass from it. It is connected with the nervous ganglion. Dujardin and Huxley have not observed either currents or an orifice in this organ.

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 the development of the nervous system is a subject 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 Lacinularia, not in adult individuals.

The exact number of species in a species of Notommatia 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 given the name of 'gills' are not fixed in certain caudate bodies have been described by Kölliker as Spermatotomes, but their nature is doubted by other observers. Mr. Huxley describes in Lacinularia certain 'vacular thickenings,' which he suggests have been previously mistaken for blood vessels. Only three or four species are generally made out in most of the species. The ova are of two kinds. Mr. Huxley says in Lacinularia 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 epiphitum of Daphnia; like it they have altogether three investments, and which do not resemble true ova either in their origin or subsequent development; while the latter are the subject of much discussion.

Professor Williamson has described very fully the development of the true ova in Melicorta virgata, from which it appears that the young are hatched do not pass through any of those larval changes which are characteristic of animals both higher and lower in organisation. All the changes which take place occur in the ovum.

The position of the Rotifera in relation to the other forms of animal life has 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 Ciliophryaceae Polyplacophora is very evident. In his Memoir on Lacinularia, Mr. Huxley gives his reasons for regarding these creatures as permanent larval forms of Echinoderma. After referring to the various forms of Rotifera, and their homologous organs, he thus concludes:

"We may say, therefore, that the Rotifera are organised upon the plan of an Amniol larva, which loses its original symmetry by the unequal development of various regions, and especially by that of the principal ciliated circle or trochaial band; and it is curious to remark that, as far as the class of animals considered, it is the most equally balanced of all (though the outline is in an extreme degree of an animal which seems to me to throw so clear a light upon the position of the Rotifer in the animal series. In a Report which I have endeavoured to harmonise the researches of Professor Müller upon the Echinoderms, 'Annals of Natural History,' 1851, I have shown that the same principle is applicable to the last of these larval states, and hence I do not hesitate to draw the conclusion (which at first sounds somewhat startling) that the Rotifera are the permanent larval forms of Echinoderms, and hold the same relation to the Echinoderms as the Hydroid Porphyra hold to the Medusae, or that Appendicularia holds to the Ascidians.

'The larva of a Sipunculus might be taken for one of the Rotifera; that of Ophiura is essentially similar to Stephanocerus; that of Astasia resembles Lacinularia or Melicorta. The pre-trochical processes of the Ascidian larvæ Brachiolaria are equivalent to those of Brachiophora.

'Again, the larva of some Ascidian forms and of Comatula are as much articulated as any Rotifera. 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 dicoidal Ascidia, the lower extremity of the series seemed to lead no-whither.

'Now, if the view I have propounded be correct, the Rotifera furnish this wanting link, and connect the Echinoderms with the Nereididae and Nematoiid 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 Rotifera are not 'radiate' animals, but present a modification of the Annuloide type—belong, in fact, to what I have called the Annulida, 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 Rotifera 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 Appendicularia.

2. Their muscular structure, which resembles that of many Crustacea.

3. Their nervous system resembles that of many Entomoptera, as Daphnia.

4. The alimentary canal resembles that of Daphnia.

5. The resemblance in the character of their ova, the Entomoptera having two kinds of ova, as the Rotifera.

6. The development of Rotifera and Entomoptera Crustacea corresponds.

Leydig concludes a very able paper by proposing to call the Rotifera Ciliated Crustacea.

With regard to the arrangement of the Rotifera, that of Ehrenberg, which is exceedingly defective, has been given under Rotatoria. From the previous observations on structure and function it will be seen 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. Siptolidae—Fixed by a pedicle.
Family 1. Fisculariaceae.
Family 2. Melicortiaceae.
Order II. Swimming Siptolidae.
Family 4. Fisculariaceae.
Family 5. Albidaceae.
Order III. Siptolidae—Alternately swimming and fixed.
Family 6. Rotifera.
Order IV. Crawling Siptolidae.
Family 7. Tardigrades.

Leydig has proposed an arrangement of his own, which is preferable to either of the above.

Ciliocrustacea.

Animals with a jointed body and a ciliary apparatus at the cephalic extremity. The nervous system consisting of a cerebrum and a ganglion and filaments radiating from 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 claval and cylindrical.

I. With elongated transversely-ridged attached Foot.
1. Fisculariaceae, Ehrenberg: F. ornata, Ehr.; F. appendiculata, Ehr.
2. Stephanoceros Eichhornii, Ehr.; S. glacialis, Perly.
3. Oxites crystallinens, Ehr.
4. Conchilia vortex, Ehr.
5. Lacinularia socialia, Ehr.
7. Tubocolia nojas, Ehr.
8. Melicorta virgata, Schrank.

II. With elongated jointed Foot, retractiles, like a telescope.
1. Calocordia elegans, Ehr.; var. C. rosae, Perly; C. cornuta, Perly.
2. Hydractia corythes, Ehr.
3. Tylaphila viridis, Ehr.
5. Actinurus neptunius, Ehr.
6. Monolobus conicus, Ehr.

III. With elongated jointed non-retractile Foot.
1. Scardinius longicaudus, Ehr.
2. Dinokarias Focilium, D. tarentula, D. pampaura, Ehr.

IV. With a short Foot and long Pedal Forceps.
1. Notomata (); N. tripus, N. longistria, Ehr.
3. Fiscularia gibba, P. Forfeica, P. gracillia, Ehr.
4. Microdon clavus, Ehr.

V. With short Foot and Pedal Forceps, which are of equal length with or somewhat shorter or longer than the Foot.
1. Hydatina senta, H. brachydactyla, Ehr.
2. Pleurotomba gibba, P. constricta, P. logenia, Ehr.
3. Fiscularia Rheinhardtii, Ehr. (probably not a Fiscularia, but a Notomata).
7. Systoma bidentata, S. balica, S. oblunga, S. cornuta, Ehr.
8. Diglena grandis, D. forcipata, D. aurita, D.

ROY, Thomas, F.R.S., was born September 15, 1776, at South Elmham, near Bectes, in Suffolk. His father was the Rev. Peter Routh, who was rector of South Elmham from 1753 to 1764, when he resigned it for Bectes. In 1774 he became the rector of Bectes grammar-school. In 1788 he became, after his father's death, under his father, matriculated as a battier at Queen's College, Oxford, May 31, 1770, but in July, 1771, was elected a dey of the college of St. Mary Magdalen. Having taken his degree of B.A., he became a Fellow July 1776, and on the 23rd of October, in the same year, took his degree of M.A. In 1781 he was appointed college librarian; in 1783 he was elected senior proctor of the university, and in 1784 junior dean of arts. He proceeded B.D. July 16, 1786, and in 1789 was elected one of the college bursars. He was elected president of Magdalen College April 11, 1791, on the resignation of Dr. Horne, bishop of Norwich. Dr. Routh's first literary publication was an edition of the Euthydemus and Gorgias of Plato, 'Platonis Enithydemus et Gorgias,' in 12mo. A Latin Latin. A Latin emendation by Josephus Routh, A.M., Collegii D. Mariam Magd. Oxon. Socitae, 1805, 3vo. Having taken his degree of D.D., Dr. Routh in 1810 became rector of Shoreditch, near Reading, in Berkshire, whither he used to retire occasionally for the benefit of his health, and to enjoy the vacation allowed him by the statutes of his college. In 1814 he published the first two volumes of his 'Reliquie Sacre: sive Auctoriarum jam Perdicionum, Secundi Tomi Post Christianae Temporis.' The third volume was published 1820, 8vo. The third volume was published in 1816. In 1820 he married Eliza Agnes, daughter of J. Biggar, Esq., of Chalcot Park, near Tylershurst. In 1823 he edited Bishop Burnett's 'History of his own Times.' In 1826 he published 'Scripulorum Ecclesiasticorum Omnia,' 8vo, and a second edition in 1840. In 1843 he published an improved edition of Burnett's 'History of his Own Times.' In 1846 appeared four volumes of a new edition of the 'Reliquie Sacre,' to which he added a fifth volume in 1848. He died December 22, 1854, at the age of ninety-nine, and was buried in the vault of the chapel of Magdalen College.

ROYLE, JOHN FORBES, M.D., a distinguished botanist, was educated for the medical profession, and was a pupil of the late Mr. Todd, of Exeter College, Oxford. He acquired that love of botany and taste for materia medica for which he was afterwards so distinguished. After passing the usual medical examinations in England, he entered the service of the East India Company. In Hindostan he worked with great diligence in the collection of plants, and especially in acquiring a knowledge of their medical properties and history. He wrote a work 'On the Antiquity of Hindoo Medicine,' in which he included a great amount of valuable information on the subject of the practice of medicine among the Hindoos. Having spent a large portion of his time in the Himalayas, where he was superintendent of the East India Company's botanic garden at Sathanpooor, he was enabled to form a large collection of plants, and to make observations on the medicinal properties of many plants. On his return to England he published his great work, entitled 'Illustrations of the Botany and other Branches of the Natural History of the Himalaya Mountains.' This work, which appeared in parts, was commenced in 1839, and finished in two volumes 4to. It contained a large amount of valuable information on the natural products of India, especially those which are useful in medicine and the arts. Although Dr. Royle did not practise medicine, his knowledge of drugs and their properties made him a popular person for the chair of Lecturer on Materia Medica at King's College, London, a position he occupied till the year 1866. The results of his experience in this department of knowledge were incorporated in a volume entitled 'Manual of Materia Medica,' which has been since the time of its publication a text-book in medical schools. Dr. Royle's botanical knowledge was often employed on the productive resources of...
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 1855 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 Linman societies,
and held an appointment in London in connection with the
East India Company. He died January 2, 1888, at his resi-
dence, Heathfield Lodge, Middlesex.

RUABON. [W RHOS.]
RUBELLAN. [MINERALS. S.1.]
RUBIANA. [CHEMISTRY, S. 2.]
RUBINIC ACID. [CHEMISTRY, S. 2.]
RUE. [RUTA.]
RUFF. [SOLPACIDE.]
RUGELEY. [STAFFORDSHIRE.]

RUSSIA. The following table, giving the popular divi-
sions, area, and population of the Russian Empire, is taken
from the Baron de Haxhausen's recent work on 'Russia:-

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Area in Square Miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1866</td>
<td>1882</td>
</tr>
<tr>
<td>Great Russia</td>
<td>328,781</td>
<td>10,299,000</td>
</tr>
<tr>
<td>Little Russia</td>
<td>150,141</td>
<td>11,055,400</td>
</tr>
<tr>
<td>New Russia</td>
<td>96,636</td>
<td>3,070,700</td>
</tr>
<tr>
<td>White Russia</td>
<td>76,559</td>
<td>2,767,200</td>
</tr>
<tr>
<td>Western Provinces</td>
<td>47,076</td>
<td>2,704,300</td>
</tr>
<tr>
<td>Baltic Provinces</td>
<td>36,516</td>
<td>1,659,820</td>
</tr>
<tr>
<td>Northern Provinces</td>
<td>59,226</td>
<td>1,536,300</td>
</tr>
<tr>
<td>Ural Provinces</td>
<td>447,788</td>
<td>10,148,000</td>
</tr>
<tr>
<td>Cossack Districts</td>
<td>123,776</td>
<td>1,089,700</td>
</tr>
<tr>
<td>Poland</td>
<td>49,230</td>
<td>4,037,700</td>
</tr>
<tr>
<td>Finland</td>
<td>135,808</td>
<td>1,412,815</td>
</tr>
<tr>
<td><strong>Total in Europe</strong></td>
<td><strong>2,029,477</strong></td>
<td><strong>69,360,315</strong></td>
</tr>
<tr>
<td>Caucasian Provinces</td>
<td>98,578</td>
<td>2,883,000</td>
</tr>
<tr>
<td>Western Siberia</td>
<td>2,681,147</td>
<td>3,509,000</td>
</tr>
<tr>
<td>Eastern Siberia</td>
<td>2,122,000</td>
<td>237,000</td>
</tr>
<tr>
<td>American Russia</td>
<td>371,500</td>
<td>61,000</td>
</tr>
<tr>
<td><strong>Total out of Europe</strong></td>
<td><strong>5,261,075</strong></td>
<td><strong>6,648,000</strong></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>7,383,532</strong></td>
<td><strong>66,005,315</strong></td>
</tr>
</tbody>
</table>

In respect to race, the Baron gives the following approxi-
mations in round numbers:-

1. Slavonic races—Russians, 49,000,000; Poles, 6,500,000;
Lithuanians and Lettis, 3,000,000; Bulgarians and Illyrians,
500,000; total, 55,000,000.

2. Other races—Germans, 650,000; Dacian Romans (Wal-
lach), 750,000; Tchudes, 3,400,000; Tartars, 2,150,000;
Mongols, 250,000; Munusheus, 100,000; Hyperboreans,
200,000; Caucasian tribes, 2,750,000; Greeks, 700,000;
Jews, 1,800,000; Gipiates, 30,800; Miscellaneous, 50,000;
total, 13,000,000.

The revenues of Russia, of which we have no recent
return, amount to about 350,000,000 silver rubles, of which
45,300,097 silver rubles were derived from the domains
of the crown. The debt in January, 1864, amounted to
1,042,465,179 silver rubles. (The value of the silver ruble
is about 3s. 4d.)

The state of the army and navy of Russia, in the year
1867, is given in the article MILITARY AND NAVAL FORCES,
&c. 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 Bukharest, and has a population variously
estimated at from 50,000 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 impres-
sion 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 courtyards or gardens.
The Pasha's konak, or palace, and the mosques, 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
ehormous losses of men in 1811; it opened its gates to them
in the invasion of 1828. 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 razed 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 1854, and were
defeated by the Turks under its walls on July 7 of that
year.

RUTHEN. [DUNSBURGH.]
RYDE. [WIGHT, ISLE OF.]
SABADILENA. [CHEMISTRY, 1.]

SACCHARIC ACID. [CHEMISTRY, 1.]

SACCHARITE, a Mineral resembling granular felspar, of a greenish-white colour, and with the constitution of Leucite. It is found in Silesia and the Carpathian Mountains.

SACCHULMIC ACID, SACCHULMIN. [CHEMISTRY, 1.]

SACLASTIC ACID. [CHEMISTRY, 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 1852 the population was above 10,000.

Sacramento City owes its origin to the discovery of gold, which gave so remarkable an impetus 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 a large and regularly laid-out town 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 eucalyptus trees, some of large size, imparting a considerable degree of picturesque ness to their general appearance. The city contains Episcopalian, Protestant, and Roman Catholic places of worship, and ten manufacturing 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.]

SAGUINUS. [Sagoin.]

SAGUS, or SAGUERUS, a genus of Plants belonging to the family of Palmae. The leaves are pinnate; the flowers monoecious, racemose; the fruits are spathes, but with numerous partial ones; the fruit hard, shining, its surface divided into numerous rhomboidal spaces. The species are natives of the islands of the Indian Archipelago, and yield sago.

S. Laevigatus, the true Sago-Palm, has the petals and spathes unarmed. This palm furnishes most of the sago sent to Europe.

S. Rumphii has the petals and spathes guarded by strong prickles. According to Martin, the sago yielded by this plant is used principally in India, and seldom exported.

SAINT-Arnaud, MARECHAL LEROY DE, was born in Paris, of poor parents, on the 20th of August 1798. Having entered the Royal Body-Guards at the age of sixteen, he rose to the rank of sub-lieutenant in the infantry of the line in 1818. Owing to some youthful vagaries, he left the army shortly after, and embraced the theatrical profession, when he first performed at the suburban Théâtre des Batignolles. In 1819 he returned to the army, and served at Toulon in 1821, 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 Duchesse de Berry afforded him the opportunity of earning the favourable notice of Marshal Bugeaud. He was subsequently appointed to the charge of the citadel of St. Blaye, where the Duchesse de Berry was confined—a post in itself, from the circumstances, somewhat painful to an man, and his conduct in it incurred for him considerable odium.

In 1836 Saint-Arnaud was sent to join the army in Algiers, with the rank of captain; he behaved with much gallantry at the siege of Constanti na, 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 in 1839. In 1841 he was appointed to an important dis posi tion induced him to quit it to enter the Zouaves the same year. In 1842 he was created lieutenant-colonel; and in 1844, on the recommendation of Bugeaud, he became colonel of the 92nd 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 Constanti na, 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 Kabylies, 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 1861, 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 cor rectly while the Prussian war was over. On the return of his mother, November 19, 1851—"nothing in this world is wanting, but to go straight forward and be bold." In the famous coup d'etat of the 2d of December following he was the President's chief adviser and instrument. Honours now accumulated upon 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 time wrote 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 "favourite idea," he tried to make the utmost of; but as his life was ebbing, he insisted on forward movements, regardless of the 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, from just up to the outbreak of the Russian war, shows him too much in the light of a daring and not very scrupulous adventurer; and he did not live long enough, when a noble field was opened to his ambition, to show whether he possessed the abilities and patience of a great military commander. But, even earlier, he exhibited the most brilliant and dashing 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 letters, written to his brother, Lettres du Marechal de St.-Arnaud, Paris, 1855, which, though exhibiting many suppressions, give much curious information respecting the last twenty-five years of his remarkable career.
SAINT HYACINTHE. [Canada, S. 9.]

SALICARIA, a genus of Birds belonging to the family Sylviculta, 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 partial lacing or pencilling, are marks to distinguish this species. It is common in the Sedge and the Reed Warblers, appear to separate them from the Sylvicula Warblers." There are four British species of this genus.

S. locustella, the Grass-hopper Warbler, is so called from its connection with its insecticidal habits. It is a 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 snails, slugs, and caterpillars.

S. phragmitis, the Sedge-Warbler, Sedge-Bird, is found during the summer in thick patches of reeds or willows, 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. White of Selborne first observed its power of imitating the notes of other birds, as well as of its occasional singing at night. It measures 4½ inches, and is somewhat a l-s-a bird than the last.

S. flammea, the Reed-Warbler, 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. cinerea, the Reed-Warbler, the Night-Warbler, the Reed-Wren. It is always 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 character of the note, the entire absence of the buoyant white stripe over the ear-coverts, and the uniform colour of the whole of the upper surface of the body of this bird, distinguish it from either the Grass-hopper-Warbler or the Sedge-Warbler, with both of which however it has many habits in common." (Yarrell: [Yarrell, History of British Birds].)

SALICIN. [CHEMISTRY, S. 1.]

SALOP. [Shropshire.]

SALT, in general. [Chemistry, S. 1.]

SALTA, the most northern of the provinces of the Argentine Confederation, South America, extends between 22° and 30° 30' S. lat., 60° 1' and 68° W. long. It is bounded S. by the province of Tucuman, E. by the Gran Chaco, N. and W. by the republic of Bolivia. The area is about 60,000 square miles; the population is about 60,000. It has been described generally under Plata, La, and we therefore only add the following more recent information.

SALTA is remarkable for its soil and climate, rapidly increasing from extreme heat to the most intense cold, permitting the cultivation of almost every kind of natural production. But the country is too thinly peopled, the difficulties of transit are so great, and the habitants have too little money to look forward to the advantages of commerce.

SALVADOR, the capital of the republic of Salvador, is a port of entry to the gold coast of Africa. The city is about 10 miles from the sea, and is situated on a spit of land. It contains about 10,000 inhabitants. It has a fine harbor, and is a port of call for ships bound to the interior of the country.

SALVADOR, NARCISSE-ACHILLE, COUNT DE, was born at Vienne, in the department of Gers, June 11, 1793, but was sent to Paris in early youth, and educated at the lycee Napoleon. He enlisted as a volunteer in 1812, and served with so much distinction during the campaigns of 1813-14, that on the 5th of April, 1814, the emperor bestowed upon him, with his own hands, the decoration of the Legion of Honour.

After the restoration of the Bourbons, in 1814, M. de Salvador was made an officer of the royal household; and in March 1818, attended Louis XVIII to the frontiers. About this time, in his twentieth year, he began that long series of argumentative pamphlets, for which he afterwards became celebrated, by the publication of two brochures, one called "Memoire sur les Grèves et les Vols," and the other "Memoire sur le Changement de Mere," in 1815, and brought out "La Coalition et la France," in which he displayed considerable talent. It produced a great sensation in more than one country.

In 1827, he became a member of the conseil d'etat, holding the office of Maitre des Requêtes. But he was incapable of submission to any control. The measure presented by M. Barthelemy, on the "Loi des Electeurs," appeared to him an organic change unfavourable to the constitution; he therefore published his "Vues Politiques," in which, regardless of place and eloquence, he fully described the nature of political parties, their power, influence, and objects. This act of independence was followed by several others, as the restoration of the Bourbons was to be advanced upon public liberty, until the starting pamphlet "Sur les Dangers de la Situation presente," produced a rupture between him and the ministry.

In 1834 M. de Salvador went to Spain, and shortly afterwards married Madeleine Oberkampf. The result of this journey was a work of more than usual length, "Don Alonso, ou L'Espagne," comprising a full account of the Peninsula, and its various political changes. It was in the course of preparation that he fell ill, and began to write his well-known articles in the "Journal des Debutants," the paper which at that period were entitled "Les Funerales de Louis XVIII," and "Le Nouveau Regne et Ancien Ministere," recommending a course of constitutional policy to the popular representatives. His independence and conscientious independence of 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 arbi-
trary 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—that there is no authority beyond the 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 revival of the war;

In 1837, during the short liberal ministry of M. de Martignac, M. de Salvardy was created Conseiller d'Etat, on which occasion Charles X. said to him: "You must admit that it is a great honor, M. de Salvardy, to have been appointed to the office which you now hold, at the head of the Polignac cabinet, was formed, in 1829, he resigned immedi-
ately.

From 1830 to 1848, during the whole reign of Louis Philippe, M. de Salvardy continued to publish his separate pamphlets, and of accusations heaped upon him; in all of which he had the Polignac cabinet formed, in 1829, he resigned immedi-
ately.

From 1830 to 1848, during the whole reign of Louis Philip-
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markable scenes which were subsequently witnessed in the town, or city as it had now come to be designated, its rapid expansion in every direction, the reckless habits and almost extravagant mode of life, and the increased size and population, are too familiar to need more than a word of reference. Nor

less well known are the terrible confusions which have so
often lain large portions of the city in ruins, to be however restored with surprising rapidity to far more than its previous condition, the streets are so wide and spacious that it is possible, upon the repair of the destroyed places on a larger, more costly, and substantial scale.

The magnificent bay of San Francisco, on which the city and its environs is described, is one of those many, out of which the streets are now tolerably well paved, and many of them are laid with
planks; well lighted, and watched; and arrangements have been made for their sanitary supervision. Several of the public buildings and churches are comparable with those in coast of the United States. The bay holds the United States, and is
so entirely in a transition state, that the most accurate account of to-day would be inapplicable a few months hence. Besides the churches there are several schools, general and
wine hospitals, and numerous benevolent institutions. The water is excellent and abundant and abound with every variety of articles of necessity and luxury. The hotels are among the most noticeable features of the place as it now is, and some of them are carried on in a very costly manner. There are also numerous eating and drinking saloons, theatres, concert-rooms, lyceums, and other places of amusement or dissipation, including not a few gaming-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 fertility of which has as yet hardly begun to be developed. The city fronting the bay is now lined with wharfs 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 with all parts of the Pacific. The extent of the commerce of San Francisco have been given pretty fully under CALIFORNIA, S. E., and it is needless to repeat the details here. In the years subsequent to that there given, there has been a considerable, though fluctuating, increase in this traffic. At the time of our last visit departing at San Francisco, but the returns are informal and incomplete. The annual clearances of shipping from the port at present, average about 600,000 tons; the entrances somewhat less. The amount of gold dust annually shipped from San Francisco exceeds in value $50,000,000 dollars. Up to the close of 1853 there had been deposited at the United States mint and branches, gold from California amounting to 207,316,177 dollars, nearly all of which had passed through San Francisco; besides which a very large quantity has been received in this country and elsewhere direct from San Francisco.

Coal is found near the city; and there are quar-
ries of good limestones. Eight or ten daily and several
weekly newspapers appear in the city.

SAN JOSE. [CALIFORNIA, S. E.,]

SAN JUAN DE LA FRONTERA, one of the provinces of the Argentine Confederation, South America, extends between 39° 30' and 32° 8' lat.; 67° 30' and 70° 20' W. long. It is bounded S. by the provinces of Mendoza; E. by that of San Luis; N. by La Rioja; and W. by the republic of Chili. The area is about 40,000 square miles. The population is estimated at from 35,000 to 36,000.

The province lies to the north of Mendoza, which it re-
sembles in its cereals and productions. [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 de Uspallata, and a large portion of the plain which separates the Paramilla range from the mountains of Cordova,
and contains the Lakes of Guanacache. The Vale of Upalata 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 cultivated by the small share of water which 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 are wheat and maize, 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 junta, or provincial assembly.

San Juan, the capital of the province, is situated on the Rio de San Juan, in 31° 4' S. lat., 66° 57' W. long. pop. about 7000. It contains the government house and other public buildings and has considerable commerce, being the most important port on the eastern coast. The province is not richly stocked with industries and the produce is largely 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 houses, with cellars for potatoes, 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 24° 42' and 25° S. lat., 56° 27' and 57° 23' W. long. It is bounded N. by the province of Buenos Ayres, E. by Cordova, S. by the province of Buenos Ayres, E. by Cordova, S. by La Rioja, N.W. by San Juan, and S.W. by Mendoza. The area is about 36,000 square miles. The population is about 200,000.

The country included within this province is described under PLATA, 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 northern part runs northward to the border of the Great Salina, and it reaches southward to the country of the Ranquel 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-spread estancias is the cattle-farms, which, as a result of most of the property is held in large estates, or cattle-farms, occur along the road leading from Buenos Ayres to Mendoza, in the hilly country, where tracts of grassy land alternate with ridges of hills and sandy deserts over which the herds of cattle wander. As the ground is generally flat and the pastures are indifferent; still cattle, horses, mules, 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 few gardens, it is a complete desert; this climate is dry and hot; rain seldom falls. The gold-mines of La Carolina are about 60 miles N. from the city of San Luis, have ceased to be worked; but the people of the village silt 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 junta, or provincial assembly, but in many years has there 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, 2417 feet above the level of the sea, in 33° 17' S. lat., 65° 45' W. long.; but it is situated on a sterile slope of a basin-like depression, 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 two of the head streams of the river Tiete, in the plain of Piramistins, at an elevation of 2464 feet above the level of the sea, in 23° 33' S. lat., 46° 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 the colony of Port tuaque in 1660. The city of San Paulo is situated on two banks of houses with two stories, built of 'taipa,' which is a frame-work of wood filled in with earth. The public buildings are—-the palaces of the governor of the province, formerly a Jesuit college, and the house of the Scheffer, a spacious cathedral, and church of the Carmelites; a college, schools, 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 Brazil, and the trade on which is chiefly based on coffee, sugar, rum, jerked beef, hides, horns, tallow; the manufactured goods of Europe and North America are imported. Santos, the port of San Paulo, is 42 miles S.W. from the city; and the distance to so steep that nearly all goods are carried on the backs of mules.

San Quentin. [California, S.E.] San Salvador, Republic of, of Central America, extends along the Pacific Ocean from the Bay or Gulf of Conchagua to the Rio de Paz. It lies between 12° 10' and 14° 15' N. lat., 86° 45' and 89° 45' W. long.; and is bounded E. by Nicaragua, N. by Honduras, W. by Guatemala, and S. by the Pacific Ocean. The area is about 8680 square miles. The population is about 300,000.

San Salvador, in proportion to its size, is 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 tract of low and generally level land; from 10 to 12 miles wide; but farther north, up to Sonsonate, 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 districts.

The islands 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 Esequilbas, in Guatemala, forms a short distance the boundary between Honduras and San Salvador, and turns the course of the Lempa, which forms the Lempa Estuary, in the direction, and flows into the Pacific a little to the westward of the Bay of Guasique. 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 into the sea 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 Lakes of Nixaca and Maudina, in the western boundary. The Lempa has a circuit of about 80 miles, and is one of the principal feeders of the Rio Lempa. It is said to communicate by a subterranean channel with the much smaller Lake of Metape, about 25 miles west of the capital, and 900 feet below the level of the sea. San Salvador, about 9 miles long and 3 miles wide; its only exit is a small tributary of the Jiboa. Mineral-thermal springs occur very numerous 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 is generally regarded as healthy. The hottest 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 and enterprising. Of all the cities of Central America, it is the most important in the northwestern 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 loss of the sheep, the cattle raise the cultivation of the land. Agriculture is in a very neglected condition. Maize is the principal crop; sugar, cotton, 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 country, and Sonsonate, chiefly for the purpose of distilling rum for the Californian market. Indigo has however always been the chief resource of wealth to San Salvador. During the Spanish supremacy, upwards of 1,800,000 lb. are said to have been annually exported, and even the quantity raised has greatly fallen off, it is still considerable. 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 Pecora is collected. This part of the country is rich in gold; it is the centre of the peccary trade, and is inhabited by a number of Indian villages, who have their own chiefs, with a kind of municipal government, and subsist chiefly on the products of the balsam, which they collect to the amount of about 15,000 to 20,000 lb. annually, and distribute among themselves. They also cut and carry to Sonsonate a considerable quantity of camphor-wood. There are large forests on the slopes of the mountains of the interior.

Cattle are numerous, and a good breed; sheep do not succeed very well; horses are everywhere abundant. Turkeys and fowls are plentiful; but there are 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 very imperfectly developed. Gold has been obtained in several places. Some rich silver-mines were formerly worked, but, owing to the general insolvency of the state, they have been for many years almost entirely neglected. Gold is now obtained near Metapa. Lead and copper have also been found.

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 in considerable demand abroad; but the present state of the foreign trade of comparatively little importance. The exports in 1853 amounted in value to 700,000 dollars; the imports to 1,260,000 dollars.

San Salvador has 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, 143 smaller towns, and 62 villages. The following are the more important places; the population is given in parentheses.

San Salvador, the capital of the republic, is situated on the Rio de Atilchate, a small affluent of the Lempa, in 13° 44' N., 87° 58' W. long. The city is of the size of 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 to the city. The city possesses considerable regularity, and had in the centre a plaza, or square, three sides of which were lined with shops, with porticoes before them, supported by a colonnade; while on the fourth side was the cathedral, an edifice which had no greater dimensions than a small chapel, containing about 20,000. But on 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 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 assembled in the great square. At length, at about ten minutes to eleven 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 city. At the same time much of the population were in their houses, and were at the very moment of being killed when 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 and villages. The city now lay desolate for some time after the fatal night; and the president 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 manufactures of iron, especially of cutlery and coarse cotton stuffs, were carried on in San Salvador; and some sugar and indigo used to be exported. Sugar-plantations are numerous in the neighbourhood, as are also extensive orchards. Messmates, or lajinas, as they are called, here constituted the bulk of the population. Near the city there are some warm and some cold rivulets, which afterwards unite, 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 fair, of which the most important is held in November after the indigo crop.

San Vicente, on the right bank of the Lempa, contains about 2000 inhabitants. It is noted for the extensive extent of its suburbs. In the neighbourhood are extensive plantations of indigo, and near the village of latapexco excellent tobacco is grown, which is known under that name all over Central America.

San Anna, situated in the western extremity of the state, at a considerable elevation above the sea, population about 9000, has in its neighbourhood extensive plantations of indigo and sugar; in the mountains near the town are iron-mines, which were formerly profitably worked.

Sonsonate, near the western extremity of the state, population about 8000, carries on at present considerable commerce by means of the port of Acajutla, exporting sugar to Peru and Chili, and rum, &c., to California. The Indians inhabiting the country about the town make very beautiful mats, which are also exported. In the neighbourhood of Sonsonate is the Ysalco, a very active volcano.

Other towns of less importance than those above mentioned are—Aquachapa, Apatzcape, Cojutpeque, Metapa, Zacatecol, etc.

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, S. 2; Guatemala, S. 2; Honduras, S. 2; Nicaragua, S. 2; Panamá, S. 2] 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.

Juarros, Historia de Guatemala; Hazekne, Reis naar Guatemala; en Central America; Baily, Central America, &c.

SANA is the capital town of the province of Yemen in Arabia, situated in 16° 5' N. lat., 44° 5' 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 with the Egyptian government, which has advanced its frontiers to Beit-el-Falik, a town in the Jehameh, about midway between Sana and the port of Mokha, on the Red Sea. Sana is a town of some 2000 inhabitants; it is built in three sides by higher mountains. The valley thus formed is about nine miles broad, but extending uninterrupted to the north. The country round about supplies a considerable quantity of coffee, which at present is transmitted to Mokha by camel. The coffee is excellent, and the coffee trade is so great, that it has been considered likely 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, silk, spices, and sugar. The town is walled, and
indiscreetly fortified. It is about 46 miles in circumference,
with narrow streets, but with many good houses; those of
the more opulent having windows of stained-glass. The
imam has two handsome palaces, both built of hewn-stone
and fortified, in the town, and there are about twenty
modern palaces, some of which have fountains and public
fountains. Across the principal street a handaxe bridge
has been thrown, as in rainy seasons a torrent runs down
the street, but occasionally the town is seven years without
rain. The popula-
tion of the town is about 3,000; of those three neighboring
towns in the same valley, Rodah, Wady-Drar, and Jeraf, the
population is at least 30,000 more. In Sana, and probably
in the other towns, the principal part of the artisans are
Jews, who supply the town for restorers of the towns:
they live in a quarter by themselves, and their number is
about 3000. (Geo. Journal, vol. viii.; Journal of
Mr. J. C. O. Cristenden to Sana, 1833.)

SANFRENCES [GALICIA.

SANDWICH. [CANADA, S. E.

SANDGINARINE. [CHEMISTRY, S. E.

SAMILICA, a genus of Plants belonging to the natural
order Umbellifera and the tribe Saliaceae. The calyx has
5 leaf-like teeth, about 
, with a long flex-
cindent convex point. Fruit sub-globose, covered
with hooked spines; no ridges; vittae numerous.

S. Europe, the Wood-Sandich, is a native of Great
Britain, in woods and thickets. The lower leaves are pal-
mate,桑, lobed, and unequal nervate. The flower


SANTA FE, one of the riverine provinces of the Argent-
in Confederation, South America, has been described under
Plata, La, (vol. xiv. p. 89). It was formerly the
center of communication between Buenos Ayres and the western
provinces, with Paraguay, whose enormous supply of maté
to those provinces, Chill, and Peru, mostly passes through
Santa Fe. But the presence of Paraguay to external com-
merce, the disturbed state of Santa Fe, owing to domestic
dissensions, and the frequent encroachments of the Indians
from the Gran Chaco, almost entirely destroyed its trade,
and reduced the inhabitants to poverty. Santa Fe is how-
ever so admirably situated for commerce that it cannot be
questioned that, if the tranquillity of the country could be
secured, the partial revival of trade, which has taken place
since the opening of the navigation of the Rio Parané, will
be more than maintained; indeed it might be almost inde-
finately extended with a larger, more wealthy, industrious,
peaceable, and energetic people. The major part of
the inhabitants are of Guarani origin, who settled here after
the expulsion of the Jesuits in 1760. There are also many
Indians, who reside in villages (of which there are
thousands), of which the city of Santa Fe, (the chief), and spio the china and
make the piscoos usually worn in the country; they are
however generally wretchedly poor and degraded. Santa
Fe, like the other provinces of the Argentine Confederation,
owns a nominal dependence on the central government; the
executive power is vested in a governor elected by the
provincial assembly.

Rosario, situated on the high and precipitous bank of the
Paran, a considerable distance below Santa Fe, appears
likely to become the commercial emporium of the province,
being situated in a fertile district, conveniently placed for
the steamers navigating the Paran; and much the most
convenient port for the foreign commerce of the western and
north-western provinces. It wears a far more com-
mercial appearance than the capital; has a larger population;
and the inhabitants are said to be industrious and diligent.
Mr. Mc'Cabe, whose visits were made for commercial pur-
poses, says, in his "Two Thousand Miles Ride through the
Argentine Provinces," that "next to Monte Video, Rosario is
the most rising port in this part of South America."

SANTA FE [NEW MEXICO, S. E.

SANTIAGO DE ESTEBO. [PLATA, LA.

SAPHRINE. [MINERALOGY, S. E.

SAPONINE. [CHEMISTRY, S. E.

SAPONITE, a Mineral consisting of silice, magnetite,
alembic, iron, and potash. It is found at Lizard's Point,
Cornwall, a place which is the most celebrated island in
that part of the lake. It becomes brittle on drying, and is of
a white, yellow, blue, or red colour.

SÁRÁWÁK, a province on the north-west coast of the
island of Borneo, of which Sir James Brooke is the Raja,
or governor, under the appointment of the Sultan of Borneo.
The province of Sarawak extends between 1° and 10° N. lat.,
109° 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 15,000.

SARCOCOLIUM. [CHEMISTRY, S. E.

SARDINIAN STATES. The dominions of the House of
Savoy constitute a monarchy, the head of which derives its
title of king from the island of Sardinia. A general statement
of the resources and political organization of these
islands may be found in the section on 19,777 square miles. The population in 1848 amounted to
4,385,972. The total area of the kingdom, including
the island of Sardinia, is 29,076 square miles (about one-seventh of the area of France), and the total population in 1848 (the
latest census) amounted to 6,916,084 (less than one-seventh of
the population of France in the census of 1861). The
continental territories are divided into 11 administrative divisions
and 50 provinces; the area and population of which
are given in the following table——

<table>
<thead>
<tr>
<th>Division</th>
<th>Province</th>
<th>Area in</th>
<th>Population</th>
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An account of these divisions and their chief towns is
given under the headings of three principal

Each province is administered by a governor called Intende-
te, appointed by the king. The province is an aggregate
of communes; each commune has a sousne, or mayor, who
is subordinate to the intendente. For judicial purposes each
province has a Court of Peace, called Tribunale, which
sits in the chief town. The provinces are divided into
districts called Mandament, in each of which there is a judge
of the peace, who has a secretary. There are in all 418
of these magistrates. There are also courts of appeal. The supreme
court of Turin has jurisdiction 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, Ongenia, and San Remo. The High Court of Savoy, which sits at Chambéry, decides all suits within the limits of the territory of the duchy of Savoy, including 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 large towns. There is a veterans' Châtelleny of Montecarlo; of Genoa; of Chiavari, Savona, Novi, and San Remo, Turin, Chambéry, 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 supervises the execution of the decrees of 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 in 1848 shortly before his death, dated February 8, 1848, which has been 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 the advice and with the consent of his ministers. 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 7,028 horses. The corps of carabiniers, in number about 4,000 (of whom 660 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 16,000 men to aid the French and English against Russia in the Crimea. In 1857 it numbered 46,373.

The naval force consists of 4 sailing and 4 steam frigates, 4 corvettes, 3 brigantines, 1 brig, 6 war steamers, and several smaller vessels, carrying in all 900 guns, and manned by 2860 men under the command of a vice-admiral. The Italian fleet is at Genoa, Villafranca, and in the island of Sardinia. The mercantile navy numbered in 1867 9034 ships, carrying an aggregate of 97,924 tons, and 31,967 men, including captains, mates, and engineers.

The public revenues of the state, as estimated in the budget of 1867, amounted to 136,961,311 francs; and the expenses to 147,326,666 francs. The national debt on the 1st of January 1861 amounted to 680,606,040 francs (27,834,300l.), including the loan guaranteed by the British government in 1855. The revenue is derived chiefly from land-tax, customs and excise duties, post-office, public works, &c.

The ecclesiastical administration of the continental states is under the four archbishops of Turin, Chambéry, Genoa, and Ventimiglia. The three dioceses of Montecnino, Tarentaise, Annecy, Aosta, Susa, Pinerolo, Acqui, Alba, Asti, Coneo, Fossano, Ivrea, Mondovi, Saitzu, Alessandria, Biella, Casale, Novara, Vigevano, Albenga, Nizza, Bobbio, Savona, Tortona, and Ventimiglia. The number of parishes is 3734; that of collegiate churches, besides cathedrals, is 74; and that of clerical seminaries, 54. There is an ecclesiastical academy for the higher theological studies at Sperga, near Turin. There are in all the continental states about 340 convents of men and 14 convents of women. The Sardinian Chambers in May 1855, all religious orders are suppressed, with the exception of those employed in "teaching, preaching, or tending the sick." The Valdenses are the most numerous Protestant sect as yet in the Sardinian states. They have their most important study at Geneva or Lussanne in Switzerland. They have churches in Genoa and Turin.

Public instruction is afforded by the royal and communal colleges. In every province there are one 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, beides grammar schools. Female education is afforded almost exclusively by establishments of men of whom there are forty-two fully engaged. 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 Nautical School in Genoa, and the famous School of Mines, which has various classes of mineralogy as the mines of Montiers in Tarasctane, and a naval school at Genoa. Most communes have schools for boys.

The continental states of the king of Sardinia have several great carriage-roads across the Alps and Apeninnes, which intersect their territory. The most remarkable are:—1, the great road of Mont Cenis, leading from Chambéry to Turin, constructed by Napoleon; 2, that of the Simplon, leading to Switzerland, likewise constructed under Napoleon; 3, the road from Genoa to Savona and Luco across the Eastern Rivières; 4, the road from Genoa to Novi by Serravalle; 5, the road Della Cornice, from Genoa to Nizza, along the Western Rivieres, begun under Napoleon, and finished under the present government; 6, the Chambéry to Chorges packet-office system throughout the Sardinian dominions, as well as diligences for travellers on all the high roads; and public conveyances, called 'velociperti,' on the provincial or cross roads. Under the late king, Carlo Alberto, railroads were begun to be constructed, and lines were projected from Turin to Genoa through Alessandria; from Turin to Cuneo, to Pinerolo, and to Susa; and 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 through Chambéry with Paris, and by the Gulf of Spezia with the island of Sardinia, from the south-western point of which it has been proposed to carry electro-telegraphic cables to Bonn in France. A railway is projected from Annecy to the Chambéry line; also from Montemelian to Grenoble, on the old line of the Isère, up the left bank of that river to the confines 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 Montemelian to Grenoble, so as to form a junction with the French railway system; and the project of cutting a tunnel 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, has been long entertained with great favour by the people and government of the Sardinian States.

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, Albenga, and Turin. The river system of Piedmont is described under Po.

The staple products of the continental Sardinian territories for exportation are—silk, rice, hemp, wine, and oil. Most of the rice, hemp, and wine is consumed at home. The principal manufactures consist of paper, silks, woollens, linens, 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 Bernard road leading to the Grisons.

The Sardinian States have Switzerland on the north, France on the west, the Mediterranean on the south, Austiran Italy, Parma, and Tuscany on the east. They comprise the three great mountain systems of Northern Italy and the Ticino. The Sardinian portion of the Lunigiana lies east of the Magra. The surface is covered on the west and north by the Alps, on the south by the Appennines, and between these two great mountain systems is a narrow and valuable and valuable portion of the country, comprising the slopes, 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, APENNINES, GENOA, PIEMONTE, SAVOY, and under the names of the several administrative divisions or provinces.

SARGASSUM. [Fogacci, S. J.]

SASIN. [Antelope]

SATURA, a genus of Insects belonging to the order Lepadopera, with three families Bembyceida. The antennae are fringed in the male; the head is small; the wings are very broad and entire; the palpi and trunk are want.ing. S. Pavostra minor, the Emperor Moth, is one of the hand-
some of the British species of Moths. It is about 3 inches wide. The colour is greyish-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 ocellus, which is placed on a light ground; it consists of a black pupil, with a yellow or grey iris, and partly surrounded by a light blue crescent. The larva lives on a green leaf, 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 Saturnia some of the largest of the Lepidoptera belong. S. Atlas, the Giant Atlas Moth, has wings measuring 7 or 8 inches across. This species also, with S. Cecropia and S. Luna, have their wings produced into a tail. The cocoon of S. Cynthia and S. Mylitta are used in India for the production of silk. Laterelle states that these are the wild species of silk-worms of China. S. Cynthia 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 saussurias-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. (Westwood.)

SAURIANS. 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 genera and species of Lepidosauria 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 suture 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; rib distinct, mobile, and with a distinct sternum. Tail elongate, tapering, rarely prehensile, generally covered with whorls of scales. Egg with hard skin. The young not undergoing any metamorphosis.

Sub-Order I. Lepidoglossa.

Tongue flat, elongate, and bifid.

Tribe I. Cylcodaura.

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, transverse, prominent tips. Eyes dilated, with two valvarial lids. Feet for walking; toes unequal, compressed.

a. Head with small many-sided shields. Tongue sheathed at the base.
   1. Monitorida. —Head-shields flattish, scales small. Inhabit the Old World and Australia. [Moorrooa.]
   2. Helodermitida. —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 flattish, covered with small often granular scales.
   3. Tretida. —Supra-orbital plate horny. Teeth solid, rooted. Scales small, granular, often with large plates. Inhabit the New World. [Trach., S. E.]

4. Lactorinitida. —Head pyramidal, covered with regular many-sided shields; supra-orbital plate rigid. Throat scaly, often with a crescent of larger scales, and a central large, scaly, behind. Tongue elongate, flat, free at the base, exsertile, long-forked. Teeth hollow, rooted. Scales granular or rhombic, keeled. Sides flat, covered with small granular scales to the species inhabit the Old or Eastern world and Australasia.

Synopsis of the Genera.

i. Nostri elliptic, 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.

Zooteca. —Lower eyelid scalloped, opaque.

Z. scutilla. —The Scaly Lizard, Common Lizard, and Nimble Lizard. It is the Loricata vivipara of Jacquin; Loricata agilis, Pennant; Zootoca muralis, Gray. It has the ventral shields 6-rowed, the temple covered with many-sided shields, with a large central shield; its colour olive; back with a large brown streak on each side, and a central black streak; belly orange (in summer), black-spotted.

This little lizard is a common inhabitant of heaths and banks in most of the districts of England, extending even to the Shetland Islands. It is also one of the few lizards found in Ireland. Its range is very limited on the Continent, and is not found in Italy or France. Its movements are graceful and rapid, it comes out of its hiding place during the warm parts of the day, from the early spring till autumn. It lives upon insects, which it seize with its mouth. In this species the eggs are retained in the oviduct until the young are ready to be hatched, and they are thus produced alive. The young when brought forth are fully-formed, and capable of running about and taking their own food. The usual length of this lizard when full grown is from 53 to 64 inches.

Z. maurus. —The Tiligueta, is a native of the south of Europe.

Z. oceophalus, the Long-Headed Lizard, is a species brought by Mr. Webb from either Spain or Madeira.

Z. Tourico, a native of the Crimea, Morea, Corfu, and Sicily.

Z. termitata, the Striped Lizard, a native of South Africa.

Z. Dermisana, a native of Australia.

Z. Galloti, Madeira.

b. Scales granular or 5-sided, elongate. Posterior nasal shields 5, small, one above the other. Collar distinct.


L. stirmianus of Milne-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 solid, distinct, brown, spotted with black; sides green, brown-eyed, 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 mistaken 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 eggs. The eggs are whitish. The eggs are contained in small pods, the number of 3 or 4 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 Zootoca vivipara, as those of average size measure about 7 inches in length.

L. vividus, the Green Lizard, has the scales of the temple inequilateral, many-sided, with a central larger one; back granular, oblong, with sharp corner sides; throat-fld 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 taken and taught to come to hand for food. It will lie coiled in the two hands, and never attempt to escape.

L. cocellata and L. lusitana, both natives of the south of Europe, are the only other species of the typical genus Lacerta.

Thelonica. —Lower eyelid transparent. The only species is T. perspicillata, a native of Algiers.

Terra. —Lower eyelid opaque. Chin-fld distinct. Abdominal shields flat and shield square. T. punctata, a native of Madeira, is the only species.


N. Landii, a native of the Cape of Good Hope.

N. tessellaris, a native of South Africa.
8. Chirocotes.—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. Chamaeleon.—Scales imbricate, all elongate, rhombic, keeled in longitudinal series, the keels forming longitudinal ridges. Limbs simple, undivided. Temple scaly.

II. Geosaurus.

Tr. scales of the belly and (almost always) of the back and sides incisural, rounded, 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. Seina.—Rostral shield moderate, triangular. Notostril in a plate between the frontal and labial shields. [Sclerodermus.]


17. Seina.—Rostral rather large, square. Notostril in a notch in the hinder edge of the rostral.

18. Acomia.—Rostral large, cup-like. Notostril in the rostral, with a narrow slit to its hinder edge.

c. Eyes hidden under the skin.

19. Typhlon.—Head conical. Rostral shield cup-like. Notostril in the rostral shield, with a slit to its hinder edge.

20. Typhlon.—Head short, depressed. Rostral shield elongated, extended up the forehead. Notostril in an elongated nasal shield. [Typhlon.]

Sub-Order II. PachyGLOSS.

Tongue thick, convex, attached to the gullet at the base.

II. Nectiasaur.

Tr. 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 connivent, pupil linear erect. Feet for walking; toes subequal, scaly beneath, and generally dilated.

21. Geckota.—The Old and New World. [Gecko.]

IV. Siroboliana.

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, compressed.

22. Iguana.—Teeth on the inner side of the jaw-bone. New World. [Iguana.]

23. Agama.—Teeth on the edge of the jaw-bone. Old World and Australasia. [Dactyloida, S. 2.]

V. Verdier.

Scales of the belly small, rhombic, imbricate; of the back, 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. Chameleoni.—Teeth on the edge of the jaw-bone. Old World. [Chameleoni.]
SAX 406 SCH

The image contains a page from a book or a document. The text is written in German and seems to be a historical or biographical account regarding individuals named Schadow, Johann Gottfried, and Helweg. The text mentions dates such as 1788, 1801, and 1814, indicating historical events or publications. The text also references various locations and institutions, such as Berlin, Munich, and the Royal Academy of Sciences. The content appears to discuss the development of a particular artistic movement or philosophy, possibly involving figures like Schelling and Hegel.

The page contains several paragraphs, each starting with a capital letter and includes technical terms and academic referencing, indicating a detailed and scholarly approach to the subject. The text is dense with information, typical of a scholarly work from the 18th and 19th centuries.
and Schellingian increased—the former system evidently victorious till 1831, when he died at Berlin, and Schelling remains a Germany already filled with the adherents of his opponent, and regarding Arick as superannuated and left behind in the philosophic march. Schelling was aware of his position; but he was of opinion that youth could not continue to exist without an active, living connection with the past; and a connection of the kind he had preceded Hegel's, but by only bringing out aspects of it not formerly made apparent, and developing some modifications, the necessity of which he had overlooked, he should be able to present Schellingian in a form which would enable it to harmonize with the necessities of the age. Nazism was a movement which would appeal to him in Germany, and which would at the same time bring it into harmony with other modern movements of German thought with which he sympathized, and especially with the religious movement. Nazism, in fact, was of the same faith as opposed to Rationalism. Accordingly, the later portion of Schelling's life—first at Munich, and afterwards at Berlin, to which he was transferred in 1841—was spent in the ruminating, and partly in the public announcement of this second or mastered edition of his philosophy. In Berlin—where he retained his chair but for a few years, but where he afterwards lived habitually—the old man was revered as a philosophic patriarch, and his society, like that of Humboldt, was sought after by savans and thinkers. But at the same time the new philosophy, that of Hegel, appeared to have held him in high esteem. To them the nature of his second or final philosophy may have been made clear by his own conversations; but he had not published one jot of it. Nazism remained powerful throughout Germany otherwise than vaguely when he died, in August 1854, at the age of seventy-nine. His death took place at Ragusa in Switzerland, whither he had gone for the benefit of his health.

In the general appreciation of Schelling's philosophy, it is necessary to remember it in its historical relations as a portion of that continuous development of philosophic thought in Germany which Kant began. Kant may be said to have been the two-fold tendency of the philosophy of the countrymen—the tendency to Objectivism, which supposes a firm external reality in the universe, underlying all phenomena, and constituting the No-Me; and the tendency to Subjective Idealism, which regards the thinking mind as the sole reality, and sees all the so-called objects and phenomena of the universe only as modifications or projections of the Me, or as so much various thought of the thinking being. "All subsequent German philosophy has been the prosecution of one or other of these speculative tendencies: the category of origin in the universe, whether the realistic side were Jacobi and Herbart; the latter of whom especially fought against the too great Subjectivism that there was, or that there might be found, in Kant's "metaphysics of nature," as he might be called the process of thought in the universe itself gradually out into the real, or at least what 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 potence," or working on 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 potence, or potence of chemism, representing a higher degree of development in the processes of the universe; this succeeds the third potence, of organically living nature, where we first see the aspect of consciousness or predominating subjectivity. Though Deity is immanent in all things, and nature is in itself sufficient to us, in the highest sense of man is identification with Deity—a 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. Such was the doctrine of 'absolute identity,' as it was propounded in Schelling's first or earlier philosophy. For a fuller view of the immense extension which he gave to it, as affecting every possible department of thought, we must refer to his own writings; but a very concise and professed summary of Schelling's system given by Chalmin 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 'Life of Schelling,' and his 'History of Speculative Philosophy from Hume to Immanuel Kant,' and more especially to the 'Infinite becoming Finite,' the 'Immanence of Deity in Nature,' and the 'Deduction of Metaphysics from the Properties of the Mind.' Information on the same subject is to be obtained from Cout; and there is a French work entitled 'Schelling;' Écrites Philosophiques, at Morceaux propres & donner une idée générale de son Systéme; traduits par A. Diderot, 1844. This work includes Schelling's lectures on the methods of academic study. His discourse on the philosophy of art is accessible in English. (Chapman's 'Catholic Series,' 1844.)
by Goethe, Tieck, and other poets. But, as we have said, the system did not remain satisfactory even in Germany. On the one side 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 zeal and moral asceticism had led to the consecration of Pantheism, 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 man, redemption, and salvation in the way of Christ. To prop up his system 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. His last volume, which, as the time was ascertainedable, will be found in Chalypseus. Suffice it here to say that, by a peculiar modification of his theory of the absolute,—according to which modification he now maintained that, though nature and Deity were identical, yet nature might not be and was not co-extensive with all Deity, that is, that the absolute might be considered as being in all objects and yet not as being exhausted in all objects taken collectively, but as being moreover a certain force or fund of nature, eternal and unchanging, that he set himself right with theology at all points, and emerged out of Pantheism into pure Theism, and out of Rationalism into warm Christian faith. Working his new notion into such phrases as that 'the part of the absolute is that of the common,' he came to an entire renunciation of most peculiar part of Deity,' and that 'what is inmanent in nature is that in God which is least God himself,' he arrived at the doctrine of a 'personal God,' and also at the notions of 'human imperfection,' and 'moral evil,' and so he reconciled his philosophy with the Christian scheme of the world's history as a fall from good and a divine recovery.

SCHIRHÜS. [Physic, Practice of, under Microscopic Diagnosis, § 2.]

ANGRILLAX Rock, of a coarse laminated structure. [Slate.]

SCHNORR VON KAROLSFELD, JULIUS, was born at Leipzig on the 20th of March, 1794. His father, Hans Schrorn 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 Schnorr was induced to yield, 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 inculcated by his masters were unsatisfactory to the development of his original genius. Happily in good time he proceeded to Rome (1815) where he at once attached himself to the society forming under the auspices of Cornelius and Overbeck, a group of more favourable example. Another young German painter brought their productions fairly before the artistic world, Julius Schnorr was recognised as one of the most accomplished of the promising 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 the most successfully executed. He also produced while at Rome 'Jacob and Rachel,' ' Jacob's Ladder,' and 'Ruth in the field of Boaz,' 'Flight into Egypt,' and other important works.

At Rome Schnorr had gained the friendship of Niebeloh, Humboldt, and Bunzen, by whom he was introduced to the munificent patron of artists, Ludwig, crown-prince and afterwards king of Bavaria. When Ludwig set about the construction of his magnificent works at Munich, Julius Schnorr was engaged with him, as he summoned to assist in decorating them. He removed with his master in 1807, and being appointed professor of historical painting in the Academy of the Fine Arts there. His first great commission was to paint the state apartments of the new palace, with a series of frescoes of national history. After these had proceeded some way however, they were suspended in order to complete the decoration of that portion of the palace called the Fest-Saalbau, three grand saloons of which were given to Schnorr to adorn with paintings of large dimensions representing leading events in the history of Charlemagne, Frederic Barbaresco, and Rudolf of Hapsburg, the three rooms being severally named after those personages. These three series of paintings occupied Schnorr above ten years. He made all the designs, prepared the models, and superintended the execution of the most important paintings, but the greater number were painted under his supervision by his pupils. They are painted in encaustica, and have a grand appearance. In some may be discovered more or less of the defects of the French method, others simplicity carried to excess, in many a great redundancy of drapery, and exceptions may, perhaps justly, be taken to much of the colouring; but after every drawback is allowed, it must be confessed that they display abundant and vigorous ingenuity, correctness and skill, and that they produce a very impressive effect.

On the completion of his historical, Schnorr returned to his mythic series. Having destroyed such of the frescoes already done as did not satisfy his more mature judgment, he set himself with characteristic diligence to the great task.

As completed the Nibelungen series occupies five chambers, each named from the section of the Lied which is depicted in it. The first called the 'Entrance Hall,' contains the event of Siegfried's death, the second or 'March by Halls' is devoted to the leading events in the life of Siegfried. The third, the 'Hall of Treachery,' contains the story of Hagen's treachery, from the moment when Kriemhild informs Hagen of the secret of Siegfried's vulnerability, to its consummation in the murder of the hero. The fourth, the 'Hall of the Beasts,' carries the story on to the death of Hagen by the hand of Kriemhild, and her own death by the sword of Hildebrand. The fifth is the 'Hall of Lamentation.' These paintings, which are in fresco, were executed in a style and with a conscientiousness and skill and his pupils. They have all the artistic excellences of the historic series just noticed, and are painted with a broader and more genial feeling. Of all the many great modern paintings in Munich, these are perhaps the most remarkable at the exterior, both among the artist's countrymen, and with strangers.

Schnorr continued to reside in Munich till he had completed his great works in fresco and encaustica, busy also during the whole time on other paintings, and designs for engravings, of various degrees of importance, but sufficient alone to have secured him a foremost place among modern painters. In 1846 he accepted an invitation to become director of the Picture Gallery, and professor in the Academy of the Fine Arts at Dresden, where he remained making a course of persevering diligence till his death, which occurred on the 13th of April 1855.

Several of the works of Julius Schnorr have been engraved. In England he is perhaps best known by his extensive and magnificent designs for the 'History of the Life of Jesus,' published in 1840, 1842, &c. These have been reprinted in London from the original wood-blocks, and though more suited to the taste of Germans than ordinary English Bible-readers have met with a large sale. They are the works of Schnorr, for they, like most of Schnorr's works, are most successful in passages admitting of somewhat exaggerated expression and action. Schnorr also made the designs for an illustrated edition of the Nibelungen published in 1843, but he is best known for his disadvantage in designs of so small a size. An elder brother Ludwig Schnorr, born in 1789, also acquired considerable notice in early life by a large altar-piece of St. Cecilia, a Feast, and some other pictures, but he scarcely maintained the position his early success had placed him at Vienna or acquired in the many portraits, as well as various historical and genre pictures.

SCHOLEFIELD, REV. JAMES, M.A., was born November 15, 1798, at Henley-on-Thames, Oxfordshire. His father, Nathaniel Scholefield, 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, in 1812, and in that year obtained the Crag University Scholarship. He took holy orders in 1813, by special permission, before he had taken his degree of B.A. Soon afterwards, on the recommendation of his tutor, he was appointed to a fellowship and the Readership in Hebrew and Oriental languages. After having held the Readership for six years, he was appointed to the Chair of Oriental and Hebrew Language and Literature at the University of Cambridge, and was in the list of Senior Optimes. About the same time he became curate to Mr. Simeon, of Trinity Church, Cambridge. In October 1815,
especially those of the poorer classes. From that period 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 earliest times, when the Scriptures were 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 mass of the Universe was all-sufficient in religion. To have an educated class, as distinguished from an uneducated, 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 raise their towns. All who sought a country where they felt the light of religious intelligence burning amongst them. Not so in the mother country. Neither the motive of love nor the motive of fear seemed to lead us to think of the education of the masses till the times in which we now live. The education that was amongst our forefathers was sufficient, in their estimate of what was good. There was a system of education amongst them which they cherished and upheld. We live in another era; but is it not for wise men to be wise to that which comes?

There are four clear divisions in the progress of education in England, limiting the inquiry to that education which is wholly, or in part, gratuitous:—

1. Education by the Church, from the establishment of monastic institutions to 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 on a more commonly termed free schools, mostly established by endowment, but also, in many cases, by subscription, for the instruction of a select portion of the poor in reading, writing, and arithmetic.
4. Education by voluntary associations, whether as Sunday schools or day schools, which, within a few years past, received a limited measure of support from the State.

The exclusive education by the Church has passed away. Education by the State never existed in England—even in the most restricted sense of state-counsel and small money. The last division—till within the last eighteen years. The education of the people since the Reformation has proceeded from the people. It has been uniformly in a state of progress, though occasionally exposed to corruption and consequent decay. The endowed grammar-schools are coincident with the progress of the middle class; the free schools which are not grammar-schools go along with the gradual rise and progress of the operative class; the Sunday schools, and the other associations of the second and third century—belong to a new era, when the universal education of the people is held to be a matter of duty and necessity. The advance of public opinion as to this duty and necessity forces on the last condition of progress—education by the State.

The endowed grammar-schools were the natural successors of the schools and chantries of the unreformed Church. They contemplated no education except the most liberal. Children were to be brought up as scholars, or to be taught nothing. The grammar-schools were the nurseries of the learned professions, and they opened the way for the highest honours of these professions to the humblest in the land. About the time of the Revolution the commercial classes, who had grown up and could not naturally think that schools in which nothing was taught but Latin and Greek, were not altogether fitted for those who were destined to the life of traffic. Uneducated men who had pushed their way to fortune, generally resolved to do something for their own class; and thus were to see in every town, not a free grammar-school, but a free school, over whose gates was generally set up the effigy of a boy in blue or green, with an inscription bequeathing that the school was founded by the A. B. or C. School. It was this school that was for twenty poor boys, to be clothed, and taught reading, writing, and arithmetic. With a comparatively small population these free schools, we venture to think in opposition to the present unprincipled beginnings of the education of the poorer classes. While the grammar-schools were making divines and lawyers and physicians out of the sons of the professional classes and the wealthier tradesmen, the free schools were making clever handicraftsmen and driving
burgesses out of the sons of the mechanics and the labourers; and many a man who had been a charity-boy in his native town, when he had risen to competence, pointed with an honest pride 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 1848, the annual income of the free schools and schools with small fees amounted to £82,047l., but some schools were excluded from the inquiry. The annual income of the free schools, described by the Commissioners as "schools not classical," was £28,744. The digest of the Commissioners’ Reports does not give us the number of endowed schools, nor of children therein educated. But we may form a tolerable approximation to the number, from the returns furnished by the ministers of the respective parishes in England and Wales, to a committee of the House of Commons, in 1818. According to these returns the annual revenue of the endowed schools of England was £300,625l., to which if we add 7000l. for Wales, we have a very near approach to the revenue of the digest of 1848; the same returns state the number of endowed schools in England as 4106, and of children educated therein, 165,433; and in Wales, schools 209, children 7625. In 1833 a series of questions was directed to the overseers of the poor in England and Wales, the answers to which would show a fallible estimate of the number of and the circumstances of the children therein educated, giving the schools as 4106, and the children as 163,764. If there were such a falling off, it may be accounted for by the fact that some of the endowed schools have been converted into national schools. Comparing all the returns, we may say in round numbers that the income of the endowed schools was 300,000l.; the number of schools 4000; and the number of scholars 150,000.

The 200,000l. 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 generations, in the hands of the most liberal and the most learned of the commonest order of worldly knowledge, all of them of religious instruction,—at an average cost of 2l. per child. The average cost of each scholar in the national schools is 11s. 2d. per annum. There have been many attempts, and some have been successful, to turn the funds of the endowed schools, contrary to the wishes of their founders, into schools for universal education; and had these attempts been supported by the Court of Chancery, or encouraged by the legislature, they might have been used in the education of the entitled funds, upon the model of the board schools, instead of 150,000l. We apprehend that, with the best intentions, some unsound opinions have been taken up by the subscribers of endowed schools. The registrar-general, in his very able Statement of the Regulations of the English education of children, says: "The 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 contemplated by the donor, and not when, under the pretence of reforming 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 recommendation of the Commissioners, 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 "no books, and no masters." "Impoverished schools," as the master of schools, in his report to the Under-education Commission, said: "I attended the inspection of schools, 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 Dulwich College, for which an Act was passed in 1807, now make their ample means much more generally advantageous. Abuses, no doubt, still exist; but, as a whole, the grammar-schools have worked well in this country. They have been alive amongst us as 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 merit, and the people of the middling classes, the free schools, are left to occupy the places in a different manner. They were the prizes for the poor boy who had no ambition, perhaps no talent, for the struggles of the scholar; they taught him what, amongst the wholly untutored, would give him a distinction and a preference in his worldly ways; and he was envied by the richer 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 consumed, and then the proceeds of it were to be productive of 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 some 900,000 children, instead of 150,000; the evil would be, that they would not be educated 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 universal. We desire most ardently to feel that he was not doing more good as an individual by leaving a thousand pounds 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 difference of the character of the two...
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, which are unable to supply the place of Reformatory schools. The repeal of the county library tax on newspapers in 1856, and the reduction of postage on printed papers, books, and MSS, may also be fairly considered as aids to education.

In addition to this 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 endeavoured by some of the Catholic benevolent societies to establish Shoe-Black Brigades and Crossing Sweepers, 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 funds for their 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 encouraged by various means, for the education of male and female, are now appointed to any of the schools, without certificates of capability from recognised examiners. For this purpose the British and Foreign School Society and the National Society have established normal and model schools, where inspectors can be appointed at different rates of salary, and certificates granted. Inspectors are appointed to visit all the schools by the Board of Education, and also by the above-named societies to visit their own; and in the Report of the General Board of Education for 1856, Mr. William Davis, B.A., says: "Remembering, as we do, the kind of education given in most of our British schools some ten years ago, it is with no ordinary gratification that I observe the vast improvement that has been effected, both in the quality of the instruction, and in the methods of imparting 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 60,000l., and that about 270 qualified teachers issue annually. By the whole about 400 masters and 320 mistresses are annually prepared for their duties.

Looking, then, to the prodigies executions 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 voluntary exertion and support, 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 ascertain with exactness the number of children daily receiving instruction by the aid of voluntary benevolence, or by endowment, 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 fifty of the population would be necessary. Government inspectors say, 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 ascertain with exactness the number of children daily receiving instruction by the aid of voluntary benevolence, or by endowment, 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.

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3,690,000, 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 average number of children sent, but an estimate, made in 1793, was 3,096,138; or 160,008; but this, however, that the census includes all persons at school, and that of the 266,611 of whose teaching accounts were obtained, 17,766 were from fifteen to twenty and upwards. This would reduce the comparative number with England and Ireland. As 100 boys and 41 girls, one in every 200 in the population are not so much frequented as in England. At the time of the census there were but 292,545 scholars, or little more than one in ten of the population. At adult evening schools the number of scholars and masters was 32,000.

Of the total number of boys in the public day schools, out of 153,718 of whom information was given, 134,337 were being taught reading, 83,005 writing, 68,174 arithmetic, 42,362 English grammar, 44,582 geography, 6770 modern languages, 9111 ancient languages, 6400 mathematics, 4197 drawing, 31,887 music, and 1098 industrial occupations. Of 119,085 girls in public day schools, 98,612 were being taught reading, 61,590 writing, 24,435 arithmetic, 54,433 English grammar, 29,579 geography, 2290 modern languages, 566 ancient languages, 1017 mathematics, 1070 drawing, 21,616 music, and 17,086 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 that they are taught to sing such songs as are used in the Church of England; only the number of schools in which such subjects are professed to be taught. In Scotland the average yearly salary of the parochial schoolmaster is 50L, with, in general, a residence; of the mistresses the salary is 36L, with a residence. Here the object of the two last-named institutions is to afford the instruction of parochial schoolmasters, but the improvement was not great, as is shown by the census returns.

In Ireland the endeavour to promote education has been constant, but till lately was of little effect. It was not until 1782, that an Act was passed that every clergyman should teach the English tongue to all in his cure. By the 12 Eliz., cap.1 (1707), a free school was to be established in every diocese. The statute of Henry VIII. was re-enacted under William III. Of course, the object in the two last-named institutions the Protestantism should be taught; or 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 schoolmaster, and not a copper tinker trouble. In 1712 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 18 schools, at which they had educated 372 children (who were of course taught to spell), and their petitions 50,000. These were the Charter Schools. In 1784, after an expenditure of 490,000L, the celebrated John Howard proved that the children were ill-taught, their education was not attended to, and that the boys only were instructed. In 1801 and yet only the children of Roman Catholics were admitted for 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 their families as before. The number of scholars increased, but were still under 2000, and the annual cost was 35,000L, which sum three-fourths were paid by the State. After a report of 1812 the whole support was gradually withdrawn from them. But though the reports 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 Wakefield in his 'Four in Ireland' called the Irish "universally educated" people. In 1817 the Kilclare likewise began their operations. They were to form two model-schools in Kilclare Place; they were to assist with grantees the founding of others; they were to establish and quality masters to publish and furnish them with 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 nine parishes, granting 20L to each of the schools of all religious persuasions. In 1825 there were 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
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 provide a system that would be fully comprehensive (i.e., with a salary of 200L), modern languages, natural history, mineralogy and geology (each with a salary of 200L), English law, jurisprudence, and political economy, civil engineering, and agriculture (each in 1864). The legal languages, the practice of surgery, the practice of archery, midwifery (each with a salary of 100L). There are also attached to each college a registrar (with a salary of 200L), and a bursar and librarian (each with a salary of 100L). A small number of students are provided with a salary of 200L. The total annual expenditure for salaries is thus (deducting 250L for the professorship held by the vice-president) 5500L.

The remaining 1500L of the annual charge on the consolidated fund is devoted to the payment of scholarships and prizes. The scholarships awarded at the commencement of the session at Belfast are: 45 of 24L each to students of the faculty of arts; 4 of 20L each to students of the faculty of medicine; 2 of 20L each to students of the faculty of law; 2 of 30L each to students of civil engineering; and 4 of 16L 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 have been continued for one year.

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 Easter, and a longer recess of 2½ months.

In 1854 the 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 built and endowed. A sum of 100,000L. was assigned out of the Consolidated Fund for the purchase of the sites, and erecting and furnishing the buildings of the three Colleges. Her Majesty and her successors were made proprietors of these provinces. It was provided that the Crown should be the executive 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 to be paid a salary exceeding 7000L for the payment of salaries and 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. An additional sum of 12,000L. 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 thirty. 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. Under the existing constitution, then, the body politic and corporate of each college consists of a president, with a salary of 800L. and a house; a vice-president, with a salary of 500L. and a house; and professors of Greek, Latin, mathematics, history, and English literature, logic and metaphysics, chemistry, physics, and natural philosophy (each with a salary of 200L), modern languages, natural history, mineralogy and geology (each with a salary of 200L), English law, jurisprudence, and political economy, civil engineering, and agriculture (each in 1864), the legal languages, the practice of surgery, the practice of archery, midwifery (each with a salary of 100L). There are also attached to each college a registrar (with a salary of 200L), and a bursar and librarian (each with a salary of 100L). A small number of students are provided with a salary of 200L. The total annual expenditure for salaries is thus (deducting 250L for the professorship held by the vice-president) 5500L.

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which was opened for students in October 1833. In 1837 a royal charter of incorporation was obtained by which the style and title of "the Wardens, 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 secured to it by Act of Parliament, usually enjoyed by chartered universities. By the provisions of the above-mentioned act, the chancellor of the university is master; 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, canonicises in the church, and rectors in the parishes, are appointed; and the professors of mathematics, astronomy, the reader in law, Hebrew, history and political literature, and natural philosophy, the lecturer of chemistry and mineralogy, and other officers of the university, are appointed by the dean and chapter. The president of the college is master. Bishop Hatfield's Hall, instituted in 1840, 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 licence. Care has been taken that the necessary expenses of students are defrayed. The number of male students is about 200, and any approach to extravagance is sedulously guarded against. In 1854 an Act of Parliament extended the right enjoyed by the University of Oxford and Cambridge to pursue physic without farther examination, to the graduates in medicine 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 1857 a similar one was passed for Cambridge. Under these commissions many 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 Wren and Keble College), and throwing them open to general competition; the enlargement of the college grounds by a number of unnecessary oaths: the establishment of private halls; and the abolishing 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. [Tourmaline].

SCHUMACHER, HEINRICH CHRISTIAN, was born on the 26th of June 1800 at Bramstedt in Holstein. 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 Darmstadt, which he was called in 1815 to be director of the observatory at Mannheim, and in 1818 he became professor of the same institute, and in 1815 as professor of astronomy and director of the observatory there. In 1817 he was employed by the Danish government to measure the degrees of longitude from Copenhagen to the west coast of Jutland, and those of latitude from Skagen, the northern cape of Jutland, to Laubeng, 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 Laubeng, 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 projected a series of meridional and meridian observations of Greenwich and Altona, for which purpose the English admiralty furnished a steam-vessel, provided with twenty-eight English and eight Danish chronometers. In 1830 he was employed in ascertaining the length of the second's period, using the observatory of Greenwich and Altona. He died in 1835. In 1813 he commenced the publication of the "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachrichten," a work that is still continued, and is the only one that serves as a vehicle for the communication of scientific facts and the astronomers of all the world, and contains accurate tables. From 1829 to 1829 he published his "Astronomische Hütten- tafeln," a good example of a carefully calculated ephemera. In 1830 he published his "Astronomische Nachr...
executed a succession of great works, such as would seem more than enough to have tasked the energy and industry of the sculptor as a maidenly 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 design intended to be the doorway from the French, was only in part by him; but the design in the northern pediment, a later work, was wholly by himself, and was of a much higher order of merit. It is called the Hermann-Schlacht, or Battle of Arminius, and is one of the most characteristic and best known works of the period, the figures of the Swiss, Celts, and Germans being realised by the sculptor’s chisel. He also executed some of the statues in the Walhalla, and the fourteen carvations representing the Walkyren of the Teutonic mythology.

For Ludwig’s New Palace (Neue Königsehau), Schwanthaler not only executed several frescoes and statues, but made the cartoons for numerous pictures which were painted in encaustic by Hiltensperger, Streidell, and others. Among these are a series of twenty-four compositions from Iphiclus, twenty-one from Sophocles, twenty-seven from Aristotle, a series from the tales of the Argonauts, another from the ‘Works and Days’ and the ‘Shield of Hercules’ of Hesiod. His most famous piece of sculpture here is however the Myth of Aphrodite, but the story of Venus was never more colorfully rendered, nor in any manner more marked by the various stages of evolution than by Schwanthaler. In the National Gallery, the frieze in relief of the ‘Crusade of Barbarossa’ (‘Der Kreuzzug des Kaisers Friedrich Barbarossa’), placed above the paintings by Schnorr (Schnurr), shows the passionate friendship of these two princes. It is one of Schwanthaler’s best pieces of work. He has also left many bas relievi 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, &c. For the façade of the Pinakothek he executed statues of twelve of the greater saints. Schwanthaler also designed the New Art-Exhibition Gallery (Neue Kunstanstaltens-Gebäude) he executed a representation of the Arts placing themselves under the protection of Bavaria. For the magnificent Ludwig Kirche at Munich, Schwanthaler executed a large piece of work in the interior, and the facade, which is placed in a row of niches over the porch, 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 of colossal size, and most of them in bronze, of Count Tilly, Field-Marshall Prince Wrede, Krithaymer, 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 Ruhmehalle). Bavaria is represented as seated, helmet in hand, shield is stretched out, and holds a laurel crown, the reward of merit; the other presents a sword against her bosom, to defend her independence; by her side reclineth a lion. The statue is considerable in size, and contains a wealth of picturesque detail. The marble is of the finest quality, and is a masterpiece of modern work. The figure of Bavaria is about 60 feet high, that of the lion is nearly 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 [Stölzle, Johann Baptist, &c.] lived to see it placed on its pedestal. It was inaugurated with great ceremony, October 9, 1850. Remarkable as this work is for its size, it is equally so for its construction, for the sculptures are a neutral point and as long as it endures it will be the most impressive monument to his genius. The Ruhmehalle however contains other proofs of his versatile imagination. In the crypt, at the end of the wings of the building are four tombs of the kings, Bavaria, the Palatinate, Swabia, and Franconia; and the frieze contains 92 metopes, all of them designed by him: 44 containing figures of Victory; 40 containing the remaining 46 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 Ventsmarkt, Vienna, around the basin of which he has placed allegorical inscriptions, the stairways to the principal rivers of the archduchy of Austria, pouring their waters into the Danube, which is represented by a colossal figure in the centre; another and finer fountain in the Pleinig, Vienna, in which is 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 groups, at Offenbach; monumental statues of the Emperors Rudolf von Habsburg at Spire, King Charles John of Sweden, the Grand-Duke Ludwig at Darmstadt, Mozart at Salzburg, Ghitha at Frankfurt, Jean Paul Richter at Baireuth, and many more. One of the more remarkable among a series of twenty statues of eminent Bohemians for a national monument at Libichow, near Prague, which however he left unfinished. Among the works executed for private patrons he can only name his statues of Venus, Apollo, Cupid, Diana, Pan, and Hercules, and his statuettes from the Oracian mythology; statues and statuettes of knights and old Teutonic heroes; and a vast number of portrait and sculptural portraits, 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 unceasing labour—on the 17th of November, 1848, having only a few months before completed his forty-sixth year. The above very incomplete enumeration of his works will more than suffice to show the wonderful energy and industry of the man; but it is necessary to examine the works themselves to form a just estimate of the artistic and mechanical merit of such a body of productions. 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 have been recorded in the annals of our art. Among these his pupils were by no means the less in his important works that there is an absence of finish, an appearance of carelessness even, which is disappointing to the spectator and injurious to the reputation of the sculptor. In his most recent works, his mind is not so much in the old teutonic fan and history, like his Hermann-Schlacht, or those types of German ideas, such as he has so grandly presented in his ‘Bavaria.’ Among the Orecian deities he falls into the old conventionalisms, or Germanises the Heilcnisch thought.

By his will Schwanthaler bequeathed to the Munich Academy of the Fine Arts his studio, with models of all the principal works executed by him. The studio stands oppo site the church in which he died, in the street named in his honour, the Schwanthalerstrasse, and preserves 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 is probably the best model of the Orders of Man, 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 urging 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-eminence in the world of mechanics, the commissioners expressed 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 the remaining 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 March 1853, they formed a Committee of 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 Board of Agriculture and Fisheries, Board of Trade and Commerce, Board of Education, Board of Science, the Museum of Practical Oeology, 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 clearly stated, was to bring the whole of the finances 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 newly established body. (The Royal Dublin Society, the University of Dublin, and the Town Hall, among others, were already on the list.)

As was said above, the institutions thus brought together under one department, were all in part supported by Parliament, and the whole of the revenue voted for their support was appropriated to the amalgamation were: Government School of Mines and Science, 1804; Museum of Practical Geology, 1857; Geological Survey, 1851; Museum of Irish Industrie, 1845; Royal Dublin Society, 1840; Department of Practical Art, including the provincial Schools of Design, 1879; etc.; in all 39,181l.; but the sum actually granted was 41,566l., additions having been sanctioned of 150l. to the School of Mines, and 2350l. 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 1801, 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 education of miners of the United Kingdom, and of the 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 of such schools was very much felt in 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 great 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 in 1847, and it was shown that it was in 1859 removed to the building erected for its reception 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 its 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 purposes of mankind, and proceeding simultaneously throughout the United Kingdom, and England and Ireland 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 on sale. But in these Scottish countries we may add the Royal College of Chemistry, founded in 1847, 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, School of, vol. 1. 473. The Department of Practical Art was created but three years ago, and is composed of the three great 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 had a short time after its amalgamation with the fine arts, from which many of the best natural artists have proceeded. It has also a good chemical laboratory; and a convenient theatre for the delivery of lectures. The Botanic Gardens at Glasnevin are given over to the Society, and the Geological Gardens, Phoenix Park, are in course of amalgamation with the Department of Science and Art. The Society is conducted wholly by its own council, the duties of the department being confined to supervision and suggestion. The Royal Dublin Society was established by the Government in 1845, and placed under the direction of Sir Robert Kane, so honourably distinguished for investigations in connection with the industrial pursuits of Ireland. In object, the Museum of Irish Industry resembles pretty closely the Museum of Practical Geology, having been established, with an object similar to that of the former institution, and carrying out the extension of that previously adopted by the Royal Dublin Society. Short courses are given during the day, chiefly to the upper classes; and other courses are given in the evenings chiefly to the sons and assistants of persons engaged in manufacturing, and having the expense of models, tools, and models of every course, when prizes are awarded to the more successful students, and a general competitive examination is held at the end of every year. In addition to this, lecturers on science are sent to the provincial towns, and lectures and examinations take place at stated periods in connection with their instruction.

The institutions which were united to form the Department of Science and Art, it will have been noticed, all belonged to England and Ireland. But in 1854 the necessary steps were taken for the formation of a National Museum of Industry for Scotland, similar to those of London and Dublin. A site was purchased by the government near the University of Edinburgh for the building; and the museum belonging to the University of Edinburgh was transferred to the museum. The Museum now has a long list of models, minerals, &c., of the Highland Society, was transferred to the Crown, and thus an excellent basis was obtained for the proposed museum. These collections are at present exhibited in the Royal Institution, and they are given in connection with them by competent professors.

The Department of Science and Art was originally constituted a section of the Board of Trade, but in February 1856 it was, by an Order in Council, transferred to the Committee of Public Instruction on Science and Art. Since that time it now forms a distinct division; its functions having reference to the secondary instruction of all classes of the community in those principles of art and science which conduces to the general advancement of the arts and sciences. The other division of the Committee of Education refers to the primary instruction of the young; the two divisions being kept entirely unconnected. The department itself consists of two sections—a School of Science, with its connected museums and affiliated institutions, having its head-quarters at Jermyn Street, and a School of Art, with its various collections and associated schools, having its head-quarters at South Kensington, where also are the offices of the Department of Science and Art. The amount voted for the Department of Science and Art in 1857 was 73,855l., being an increase of 9160l. over the previous year, and 32,260l. more than the vote for the several institutions prior to their consolidation.

It remains to notice shortly the present position of the two great divisions of the Department of Science, applied to Mining and the Arts, has, in the words of the official prospectus, "for its chief object and distinctive character (to which everything else is subsidiary), to give a practical direction to the course of scientific study." And the course of instruction which is imparted to the student, while it does not profess to qualify him to undertake the direction of mining or other technical operations, is intended, in combination with future training, "to render him in the best degree competent to take charge in any special branch of industry, but to promote its further development." The institution is under the general supervision of a director, Sir R. I. Murchison, the eminent geologist, who succeeded the late Sir H. T. de la Beche, and the instruction is given by professors of Chemistry, Natural History, applied to geology, Physical Science, Applied Mechanics and Mechanical Drawing, Metallurgy, Geology, and Mining and Mineralogy, each of men the highest standing in their respective departments. The mode of instruction is entirely practical, laboratory instruction forming a large part of the course of study. Students are instructed in teaching in the laboratories and drawing office, and by field surveying and geological and natural history excursions. The field of study is separated into—"a general division, for those men who are destined to practice in the general branch of scientific study," and an "applied division;" a technical division for those who propose to engage in arts or manufactures depending chiefly either on chemical or on mechanical principles. For each of these divisions the course of study extends over two years, of three terms in each. Students must be at least 16 years of age.
Schools of Art. 3. To hold public inspections and examinations, and to award medals and prizes to the most deserving candidates.

2. To collect together works of art, pictures, &c., in the central museum and books of art, &c., at 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 for schools, but it is also prepared to supply certificated Art-masters or mistresses to teach drawing to schools in connection with the Committee of Council on Education. The course of studies embraces, besides all the branches of Art-Education, instruction in various direct applications to the mechanical and manufacturing industry. It comprehends the following subjects:—Free-hand, architectural, and mechanical drawing; practical geometry and perspective; painting in oil, tempera, and water-colours; modeling, moulding, and casting. These classes include architectural and other ornamental, flowers, landscape, objects of still-life, &c., the figure from the antique and the life, and the study of anatomy as applicable to Art; and some technical studies, such as enamelling and the decoration of glass, &c. 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 order to give a preparatory course to schools and others 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 Ornaments, &c., is somewhat restricted in its present state, and is to be extended and improved entirely by the Department. It was commenced in 1855, when a suite of rooms in Marlborough House was appropriated to it.

The Department has a large collection of objects, both of foreign and of domestic productions, in existence of majolica and other examples of ancient, as well as many 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 building and in the collections connected with it, a large number 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 sculptors, placed there by the artists by order of the Department; casts of the works, &c. The very fine gallery of British Art, containing no less than 3234 oil paintings, and a considerable number of sketches, by eminent living, or recently deceased, British painters—the munificent gift of Mr. Sheepshanks to the nation—is also, by his desire, deposited in a building erected for it, in immediate contiguity with the Museum; it has been "given for the purpose, as the primary object, of being used for reference and instruction in the Schools established in connection with the Department of Science and Art." All these collections are open free to the public on three days of the week; on the other three days (being "students' days") the public are admitted on payment of 6d. each person. The collections are also opened to the public free on two evenings of the week—an innovation which has proved exceedingly popular. To the Art Library—a very excellent one—though formed primarily for the students, any person is admitted on payment of a trilling fee, which affords access for a week. Evening lectures to working men are also occasionally given there.

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 considerably in the number of their students. These schools are, like the Schools of Science, in the main self-supporting, but the Department assists in paying the certified teachers, and in various ways aids in providing the school materials, and in rendering assistance to the students. They are now in all sixty-nine in number; and at the last return they were the means of affording instruction in
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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 be fair enough to rank 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 instruction in drawing. This is to be done gratuitously in aid of the 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 or rural towns by any class or class of objects contained in the Museum for exhibition and study upon application from the local authorities.

SCIÉ FACIAS. A simpler, less explicit, and less dilatory method of proceeding than that by scié facias, has been established by the Common Law Procedure Acts, 1853 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 proceeding, the possessor shall be entitled to the simple cases of change in the parties to a suit. If it be not adopted, a writ of Revivor, as it is now called, may be issued, the object of which is the same as that of a scié facias. It is, however, directed to the party and not to the sheriff, and must be executed in the county where the scié facias was directed to the sheriff of the county where the science in the original action was laid, and was served by him. The subsequent proceedings in Revivor resemble those of an ordinary action. The writ of scié facias in Chancery to recover patents is not affected by the above-mentioned statutes. Nor is the writ of scié facias itself abolished. In some cases it is still the only method of proceeding; for instance, to enforce a judgment against the terre tenus of a tenant in common.

SCILLITIN. [Chemistry, S. 1.]

SCITAMINACEAE. 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 recognized. [Marantaceae; Zingiberaceae.]

SCOMBERESOX, a genus of fishes belonging to the family Eidosida. The only British species of this genus is the Sea Pike or Skipper, called also Gowndook in Scotland. It is a large fish, like a British bonito, but not an abundant fish, but has been taken off Berwick and Yarmouth, and Portland Island, and on some occasions has been even plentiful on the coasts of Scotland. [Eosed.]

SCOPULIDAE, a family of Malacostracous Abdominal Fishes, commonly called anemones. 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 Scopulus is found in the Mediterranean.

SCORESBY, WILLIAM, was born in 1790, and commenced his nautical life only ten years afterwards, accompanying his father, William Scoresby, the distinguished Polar navigator, in the Danube, 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 Whitby. 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 minors and purchased, through the grades of the service, until he was second lieutenant of the ship, 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 to the encouragement of his son's great satisfaction of his father, to regular study, and for a considerable portion of two sessions, at Edinburgh, where he secured the friendship of the late Professor Jamieson and other professors at 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 accompanied 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 attained by previous attempts. They were unsuccessively in 80° 50' 25" N., Lat., 61° 1' 55" and 61° 12' 42", and, once by estimation, as far as 61° 30', the nearest approach to the pole,—within about 510 miles,—at that period authenticated. It has been exceeded only by the voyage of Dr. (now Sir) George Warren in the Vega, who, in his celebrated boat expedition, during his fourth voyage, in 1837 reached 82° 45', the highest point yet attained; but this was accomplished by travelling across the ice, which had to be commenced on gaining the latitude of 79° 50' 30'; inferior to that attained by the Scoresbys by 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 by such expeditions, if carried out according to his views, the pole could be realized, and that the most valuable result would have been the satisfaction of learning that Parry himself had expressed the same conviction. It is proper to note in this place, in order to preclude error, that the sovereign of the Resolution in this voyage, states, in an "Account of a Voyage to the Arctic Regions," published by Scoresby, that he had the satisfaction of learning that Parry himself had expressed the same conviction. It is proper to note in this place, in order to preclude error, that the sovereign of the Resolution in this voyage, states, in an "Account of a Voyage to the Arctic Regions," published by Scoresby, that he had the satisfaction of learning that Parry himself had expressed the same conviction. It is proper to note in this place, in order to preclude error, that the sovereign of the Resolution in this voyage, states, in an "Account of a Voyage to the Arctic Regions," published by Scoresby, that he had the satisfaction of learning that Parry himself had expressed the same conviction.

In consequence of information communicated by Captain Scoresby to Sir Joseph Banks, the 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 to explore the unknown regions of the Arctic Ocean; the latter of which objects has at length been accomplished by Sir Robert McCullogh in one of the recent searching expeditions for the ill-fated Franklin. Sir Joseph Banks was very desirous that his young but experienced friend Scoresby should be selected for the hazardous task of having deferred the sailing out of the ship Famine, which the son was to command, under the idea that she might be taken up for service. Their expectations however were altogether disappointed, and as it was well known, Captain (the late Sir John) Ross with the Isabella and Alexander, and Captain Buchanan with the Dorothea and Trent, were appointed to make the attempt. It appears to be the policy, as perhaps to be discouraged on grounds of national juncture, however the consequences of it may be, that particular instances of the Board of Admiralty, to reserve those arduous expeditions and others destined for marine scientific research, as the encouragements 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 Modern Arctic Expeditions" published in the Edinburgh New Philosophical Journal, vol. xx. 1830-36.

Having completed his voyage to the Spitzbergen and Greenland-Whale-Fishery, Captain Scoresby published, 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 1,217 pages and 137 plates. This work was received with great satisfaction by the scientific world, and has been taken at the suggestion of Professor Jamieson, who did service to scientific literature by stimulating his pupils to apply research to 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, and justified the wisdom of the whaling shippers when they commanded, in countenancing a degree of enterprise in geographical discovery—not unconnected however with the object of the trade—which had not before been united with the pursuit of whales, except through accidental circumstances. He returned from a voyage in 1822, 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 who was absent. He now quitted the whale-fishery, but published 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 1822, in the ship Baffin of Liverpool, in 1823, 615 pages, with 8 plates, including a chart, &c. A German translation by Professor F. Kries was published at Hamburg in 1825. Not long after the appearance of this work, on the 17th of June, 1834, he was elected a Fellow of the Royal Society, being already a Fellow of the Royal Geographical Society; and having been for some years a Fellow of the Royal Society of Edinburgh. He subsequently received one of the highest honourary rewards of scientific eminence, in being made a corresponding member of the Institute of France, or Académie des Sciences; and the various questions, which he had so successfully solved, round about Edinburgh, 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 served with him, is evident from his own judgment, tempered with heart. His success in whaling 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 to his rules. In his later voyages he adopted the temperance principle on board his vessel, finding that hot coffee was a 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 Queen's College. Orders in due course, taking the superior degree of D.D. in process of time. The Mariner's Church at Liverpool having been then established, he accepted the chaplaincy. Private circumstances, however, prevented his taking vicar of Bradford, a very large parish in Yorkshire. After some years however he 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 evangelical views 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 service in which he had passed his earlier years." He took also enlightened and enlarged public education, while vicar 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 in the course of his life. He had early become interested in the subject, and his magnetic investigations have been the most important to which he contributed, the principles effecting 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; 92 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, to attract, mass, harden, quality, form, &c., as also concerning the composition of cast-iron." London, 1843; 250 pages, 2 plates. Vol. ii. part iii. "Investigations, with illustrative experiments, on the nature and phenomena of magnetic induction, and the mutual influences of the magnetic poles. "With figures and plates.

To the section of Mathematics and Physics of the meeting 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 publication, concerning the various effects and properties of the Magnetism of Iron ships and its changes." He also recalled attention to his plan of a compass aloft, 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 firms interested in the building and property of iron ships, but had received the particular sanction and commendation of Mr. Airy, the astronomer-royal, and of Lieutenant M. F. Maury, the American hydrographic officer. He had been invited by some gentlemen for adoption for determining safe compass guidance, 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 various questions of scientific and practical importance to mariners in his age a voyage to Australia in the Royal Charter. He was received at Melbourne with great distinction, almost with enthusiasm, and was granted the honorary degree of M.A. by the University of that city. He returned in 1856, but with his constitution much impaired, making a tedious journey to the arduous labour to which he had subjected himself during the voyage; and after a lingering illness he died at Torquay, on 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.

1. Memorial of an Affectionate and Dutiful Son, Frederic R. H. S., who fell asleep in Jesus December 31, 1834, and 16 years. 2. Discourses to Seamen: consisting of Fifteen Sermons, preached in the Mariner's Church, Liverpool, treating for the most part generally on subjects of Christian Practice and Duty, by the Rev. Mr. Scoresby, preached in St. James's Church, Liverpool, on the 12th of August 4, 1850, on occasion of the Meeting of the British Association. 3. Memorials of the Sea: 1, 'Sabaths in the Arctic Regions;' 2, 'The Mary Russell.' Of both these two volumes, the latter contains the portion of the Author's book on the Adventurous Life of the late William Scoresby, Esq., of Whitby,' 12mo, Lond., 1831, pp. viii. and 332. 4. The Franklin Expedition; stating his views on its probable course and fate, and on the measures of search for it.

Zeistic Magnetism. The contents of this work on a peculiar subject are thus stated by the author himself: "Original Researches in Memetic Phenomena, with the view of eliciting the scientific principles of this mysterious agency, and in which experiments are described, eliciting strong electric or magnet-electric conditions, with the interpreting of the memetic influence by electricity, and the neutralising of the effects of substances having an ungenial influence on the subject, by the same process as was found to neutralise the electricity of sealing-wax, &c., as acting on the electroscope.

Dr. Scoresby had prepared for publication prior to his decease, a work fully detailing the results of his most recent investigations in nautical magnetism. As he contemplated, while preparing this work for press, the continuation of the series of 'Memorials of the Sea,' in which the story of his own life should be told, it is not improbable that this also may find a place in the work, which had not appeared in 1836.

SCORZONERA. A genus of Plants belonging to the natural order Asteraceae. The pappus is feathery, in several rows, Bracts imbricated. Receptacle naked. Achenia neither stalked nor beaked, with a lateral seg.

S. Hispanica, Viper's-Grass, has a cylindrical succulent root, branches monoequidius; leaves amplexicaul, lanceolate, wavy; involucres smooth; flowera yellow. It is found
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Prince Wrede was defeated. Napoleon afterwards gave him the command of the 6th corps, and ordered him to defend the right bank of the Rhine, at Cologne; but he was obliged to fall back into Holland, where, however, he had not included his name in their list of proscription. In 1819 he was chosen deputy for Corsica, and soon became distinguished as a member of what was termed the liberal opposition in the French National Assembly. In 1826 he succeeded General Foy as representative of the department d'Aisne. After the revolution of 1830, Louis Philippe, in August, appointed him minister of marine, and in the following November, on the retirement of Mole, 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 1838 he was sent to Syria as minister to the Levant, and was recalled in 1841. He was sent to Algeria in 1841, and was succeeded by a son of his, who died in 1844. After the death of his son, he continued to live in Paris, and was for some time in very poor health. 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 grenadiers carried the coffin on their shoulders. He left a widow and five children. His death was mourned with deep regret by his countrymen.

SEBASTEN PLUMS. [CORDIA, S. 2; CORDIACE.] SEGALTE, 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 Trisetum, to which the Common Winter-Rye belongs. [Tartaric.] 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 its wild state, except in a few scattered places, away from the possibility of escape from cultivation, brought there by the sow. [Rye.] 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. Millerianus 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 these terms are used in a similar sense in the vegetable kingdom. It is more than probable that the common excretions of plants are more 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 are not so simple as this theory would appear to be. In other words, 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 which the wood of plants, the nutritive 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.

First, Nutritive or Assimilable Secretions, that is, substances which have been forming in the plant, for use for forming its tissues, and constructing the mass of which it is composed. These are the substances which are employed: cellulose, starch, sugar, oil, and protein. The first four are distinguished by containing the elements carbon, hydrogen, and oxygen, whilst the latter contains in addition nitrogen. [Cellulose; Starch; Sugar; Oil; Protein, in Flora, Organic, S. 1.] These substances are found universally in the vegetable kingdom. No cell can be formed without one of the ternary compounds, and a portion of the quaternary substance in some form. Hence they are called Ternary Nutritive Secretions. These substances are also easily convertible one into the other; the sugar may be converted into starch or cellulose, and vice versa, and thus their powers are commingled functionally and continuously with the assimilative processes of the plant.

The second class of substances are called Non-Assimilable or Special Secretions of Plants. They are substances which do not play a part in every part of every plant. When once formed they are not used up. The dead leaves of the plant 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 the substance which gives the peculiar green to the leaves and other parts of plants. [Chlorophyll, in Flora, Organic, S. 1.]

These secretions are very numerous, and may be classified under certain general heads.

1. Colouring Matters. 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 woolen cloths of various kinds. These colouring matters would appear to be related to the decomposition of the assimilable secretions, as many of them bear a close relation to both the ternary and quaternary forms of these secretions.

2. Aromatic Matters. Having an acid reaction, and capable of combining with the oxides of the metals, are very common in the vegetable kingdom. The most familiar forms are those which occur in fruits, as the oxalic, citric, malic, and tartaric acids. Oxalic acid is found in the Ocaulis Ascocaria, hence its name, and other forms of Omodiscus. It is also found in the Caususane and Polygynaceae. In the latter order it exists in the species of Rhamnus (Rhubarb), used for making pies, and also in the Sorrel (Rumex). In all these cases it is combined with the oxide of some metal, either the potassium or calcium. In sorrel (Rumex acetosa) it exists as a quinate, or rhamnose potassium, which, when separated, is called Salt of Sorrel. In the Caususane it exists as an insoluble oxide of lime, in the form of raphides. These are crystals of lime, which have a transparent line in the middle, and are very common in the vegetable kingdom. Citric Acid is found in the fruits of the order Auranthus, as the lemon, orange, lime, shaddock, &c. It is easily separated from these fruits in a crystalline form, and is used in the 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 potash. In all these cases it is used as a preservative for the fruit and 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 less. This property of tartaric acid makes the product of the latter difference from the former, from which to make wine. The juice of fruits containing citric acid, whose salts are soluble, are much less fit for wine-making. Malic Acid is the acid found in the apple,
and which gives the sour taste to verjuice, as also to the fermented juices of the apple and pear—cider and perry.

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 metal oxides and the metallic oxides with which they may combine take the place of the alkali, 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 alkalis or alkaloids. Tannic acid, formerly called tannine, is found very generally present in the woody parts of plants. It is 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 and dyeing, and for these purposes it is obtained from the bark of oak, elm, willow, sumach, and other trees. It exists in the fruits of the Chrysobalanaceae, and the legumes which are called 'divi divi.' The vegetable extracts called oak tannin, tannin, and the exudations which are sold by the name of kino consist principally of tannic acid. This acid is converted into gallic acid by oxidatio-n. 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 Quercus, especially Q. infectoria. These excrections are called gall-nuts, and from the presence of this acid in them it has been called gallic acid. [Gallis.]

The alkaloids are substances found in the leaves, fruits, bark, and other parts of plants. They are some of them present in species of plants which possess other alkaloids, but more generally diffused. Many of them possess extraordinary properties in relation to the animal kingdom, producing poisonous effects; such are strychnin, from the Strychnos Nux vomica; morphia, from the Papaver somniferum; and cocaine, from the Conium maculatum. These substances are always found in combination with organic or mineral acids. There is however another class of substances closely resembling these in their composition and action, which do not combine with acids; they are called free bases. Of these there is the principle of the galls, which in this respect is the same as thethein, the principle found in tea, coffee, and Paraguay tea; 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 non-volatile oils, and are also generally associated with the active 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 often combined with gum, forming the substances called gum-resins, and from this combination it may be supposed they are directly formed from the tarry assimilable secrections. When occurring with gum, as in the case of the gum-resins of Canaean, or as the resins of the Coniferæ and in Myrrh, they are combined with volatile oils, which appears to give them their peculiar odours, savours, and action. In the Coniferæ the volatile oil is the principle of the gummy, or resinous, part of the tree, and is used in the arts under the name of oil or spirits of turpentine. [Coniferæ.] Wax is another substance very commonly found in plants, and having relation with the fixed oils. [Wax.] Cearacha and Gotta-Percha are also composed of non-assimilable substances and are remarkable for the absence of both oxygen and nitrogen. [Cearacha; Ionomandra, S. F.]

Although the processes by which these products may be gradually elaborated in the vegetable kingdom may be very numerous and much more complicated than any process with which we are at present acquainted, we can readily explain the 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 WATER, BY THE LOSS OF OXYGEN.

<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>C_2H_2O_4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malic Acid</td>
<td>C_4H_4O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tartaric Acid</td>
<td>C_4H_4O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric Acid</td>
<td>C_6H_8O_7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malonae Acid</td>
<td>C_4H_4O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caffeine</td>
<td>C_8H_14O_5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch</td>
<td>C_6H_12O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cane Sugar</td>
<td>C_12H_22O_11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose (dry)</td>
<td>C_6H_12O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quassine</td>
<td>C_6H_12O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salicine</td>
<td>C_10H_18O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil of Turpentine</td>
<td>C_18H_34O_6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil of Juniper</td>
<td>C_14H_22O_6</td>
<td></td>
<td></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 C_4N_2H_6O_5</td>
<td></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Indigo C_6H_4N_2O_5</td>
<td></td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Nicotine C_6H_4N_2O</td>
<td></td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Morphine C_10H_14N_2O_5</td>
<td></td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Quinine C_8N_2H_6O</td>
<td></td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Theobromin C_8N_4O_7</td>
<td></td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Theine C_12N_2H_12O_5</td>
<td></td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Albumen C_32N_22H_14O_11</td>
<td></td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>Caseine C_34N_22H_14O_11</td>
<td></td>
<td>288</td>
<td>288</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. Sulphur and phosphoric acid are found in fibre, casein, and albumen. The alkaloids 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. [Savo; Rose.]

SEDGE, SEDGES. [Cladium, S. 1; Cypriaca, M.]

SEDGLEY. [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-Infrérieure, which bounds it on the south. The Bresle separates it from the department of Somme. It is divided into five arrondissements: Havre, Fecamp, the new of Dieppe, and Tréport. Ettretat and Criel, a small coast village, west of Tréport, 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-Infrérieure, to which that portion of the territory of the department of Eure that lies east of the Seine to the Epte is added. Seine-Infrérieure, by this arrangement, has Seine-Oise to the south-east; and holds the new two new arrondissements, Eibouf and Gourary, chiefly formed. At Gournay, the railways authorised to be made from Amiens to Rouen, and from Beauvais to Tréport, through Amale, are to meet. In the absence of any material return, it is only proper to offer any conjectures as to the area or the population of the new department; though these may be very nearly ascertained by consulting the articles Eure and Seine-Infrérieure, which have been described as they stood previous to the recent alterations.

SELENAULIDE. [Chromatitis, S. 2.]
SENEGUNGE. [CHEMISTRY, &c.]

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 statute 20 & 21 Vict. c. 56, or a judicial separation has been obtained by the wife [DIVORCE, &c. 3; JUSTICE OF THE PEACE, &c.]

SEPARATION, JUDICIAL. Until the statute 20 & 21 Vict. c. 56, divorces a vinculo, which put an end to the marriage altogether, were not obtainable. Act of Parliament, while the legislature would not pass in favour of a husband, until after a sentence of separation a menset et thoro in the ecclesiastical court, and would not pass at all if his conduct had not been free from reproach. [DIvORcOx.]

Either a divorce a vinculo, or a judicial separation, is obtained on the ground of adultery, cruelty, and certain other causes, a divorce a menset et thoro.

The remedy now given in such cases by the Court for Divorce and Matrimonial Causes is termed a judicial separa-

tion. This, like a divorce a menset et thoro, does not dissolve the marriage; it does not bar the wife of her dower, 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 he cannot sue in her name; he is deprived of the benefits of his 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 more, or other misconduct, as an absolute and final settlement of the affairs of both parties, which 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 either of divorces or judicial separations, 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 sup-

port out of the husband's estate, is to be reasonable, which is cre-
ted by the Court, at all the circumstances of the case, and to be proportioned to the rank of the parties.

SEPPINS, SIR ROBERT, F.R.S., the distinguished naval

architect, received his education as a shipwright under Sir John

Henslow, surveyor of the navy, and continued in connection with the important service of our dock-yards during a period of fifty years. He was the author of many improvements of the first order in our naval architecture, including the system of winged hulls, as seen in our 74-gun ships. He was master shipwright of Chatham Dockyard. This system formed the subject of two memorable papers in the 'Philoso-

phical Transactions' of the Royal Society, for the years 1814

and 1816, one of which, 'A new system of winged hulls,' delivered Dr. T. Young, For. Sec. R. S. [Young, Thoma-

s] 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 would oppose a powerful mechanical action to every change of position 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, creaking, leaking, and rapid decay; and filling up likewise every vacancy between the timbers, which are occasion-

ally the unavoidable receptacles for foul air, filth, vermin, and various other sources of rottenness and disease. These improved methods led to certain results, both with respect to the prejudices of the older shipwrights, a body of men who have 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 navy under the enlightened administration 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. Seppins to the invention of the system of diagonal bracing in naval architecture is indi-

cated, and the importance of place to record here the follow-

ing point of information. It can be no derogation to 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, Assist. Sec., R.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, is a principle which, when the "diagonal bracing" system owes its strength, was original with his father at the time of its construction, that is about the year 1766. Sir Robert Seppins introduced other improvements into our system of naval architecture. The admiralty presented him with 1000L 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 held, and promoted the interest of this art. Finally, when 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. 275-292, 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 sheer bulks 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 are formerly of very little value; but the most valuable of all the reforms is the construction for which the navy of England is indebted to him was the substitution of round for flat sterns, which afford increased strength to the frame-

work of the ship, greater protection against pooping in heavy seas, and a more ready means of recovery by the bow, a more secure and effective position for the rudder, and a stout platform for a powerful battery, embracing a sweep of more than 180°. This capital improvement was strenuously opposed by many distinguished naval officers, and no reason was given, save the propriety, for which were better suited for their purposes of state than of service, but the good sense of less prejudiced judges, happily prevailed, and secured for our ships of war an additional claim upon the supports of the nation. Sir R. Seppins was, besides, on finance of the House of Commons on several occasions testified his respect to his official merits, 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. Seppins, and their author received many substantial proofs of their sense of his merits; the Emperor Alexander of Russia, and the kings of Denmark and Holland, presented him with memorials of their appreciation of what he had done, and supported. 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, which were published under the name of Sir R. Seppins, communicated to the Royal Society a paper 'On the principle of constructing ships in the mercantile navy,' which was inserted in the 'Philosophical Transactions,' for 1810. Dr. Young's paper, also referred to above, though not communi-

cated to the Royal Society till 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 'Mis-

cellaneous Works' of Young, (vol. 1. p. 656-662) together with the official correspondence relative to it between the latter and Sir J. Barrow. Sir R. Seppins 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 Ox-

ford to erect a statue of Sir R. Seppins, but the proposal was not carried into effect, the commemoration of 1836, but severe indiscipline compelled him to decline it. He died at his house at Taunton in Somersetshire, on the 25th of April 1840, aged seventy-

two, leaving several children; his wife's dease had taken place a few years before.\(^\text{5}\)

SERICA. [MELIOLITHUM.]

SERICOSTOMA. [PLACIPENNER.]

SERICULUS. [MELIULIDE.]

SERPENTINE. As a mineral Serpentines, although rarely, in the quartziferous rocks of the Alps, Italy, and the Near East, is usually greenish 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 presence in the gem trade becomes you play away on exposure, and feels sometimes a little mucus. The fol-

lowing varieties are recognised:

Precious Serpentine.—Purer specimens of a rich oil-green
colour, and translucent, breaking with a splintery fracture. It is a beautiful stone when polished. It has the following composition:

- **Silica** 42:5
- **Magnesia** 44:2
- **Potas. of Iron** 0:8
- **Calc. Acid** 21:9
- **Water** 12:4

Total 100:0

It gives off water when heated; becomes brownish-red before the blow-pipe, but fuses only in the edges.

**Common Serpentine.**—Opaque, of dark-green shades of colour.

**Picrolite, Schiller Asbestos.**—A Fibrous Serpentine, of an olive-green colour, constituting seams in Serpentine. The fibres are longer, finer, and brighter. It resembles some forms of asbestos, but differs in its difficult fusibility. Thomson’s *Baltimorite* 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:

- **Silica** 40:1
- **Magnesia** 40:1
- **Potas. of Iron** 27
- **Water** 15:7

Total 99:9

**Kerolite.**—Near Marmolite, but folia not separable.

Serpentine 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 Verdonite and the Marble. It does not melt well, although at first it receives a fine polish. Chromic 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.

**Serrutula, a genus of Composite Plants of the order Cynaraeae, and the section Serratulae.** The heads of flowers are discaceous by abortion; the involucres are imbricated, slender and winged; the scales of the receptacle split longitudinally into linear bristles; fruit compressed, not beaked near the base; oblong oblong oblique; the pappus persistent. There is but one British species of this genus, *S. tinentia*, the Saw-Wort. (Sibbington: *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 Woivod-ship of Servia and Temesvar Banat, and includes the Banat of Temesvar (comprising the counties of Bacău, Bodrog, Torontal, Temeswar and Krassow, the principal towns of the territories of the Bacsa and the Banat), and the Syrmian districts of Ruma and Iliok. The emperor is styled Grand-voivode, and the actual governor Vice-voivode, who resides in Temesvar, and is assisted by a ministerial council. This council is composed of one representative from each county, and is a self-appointed body. The voivode-ship is divided into 6 districts. It has an area of 11,528 square miles, drained by the Maros, the Temes, the Theiss, and the Danube; the population amounts to 1,425,321.

**Servitude, Penal.** This punishment has come in place of the former punishment by *transportation*, said to have been established by the *Car. II.* c. 5, s. 2, enabling the judge of assize to transport certain offenders to America, to remain and not to return. The *Car. II.* c. 5, s. 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 under the *Car. II.* c. 7, s. 4, directed a judgment of transportation to be entered, when 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 four years. The *Car. II.* c. 6, 2 & 3 *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years. The *Car. III.* c. 11, directed a judgment of transportation to be entered, when 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 four years.

The next statute on the subject was the *Car. III.* c. 11, "a foundation of the law of transportation," which enacted that, when the Crown was 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. The *Car. III.* c. 21, directed the Crown person *at large* in Great Britain, before the expiration of the term of transportation, liable, on conviction, to suffer death. The 8 Geo. III. c. 15, extended the powers of the judges to make orders for transportation by enabling them to do so by a special order by the statute. The King was empowered to authorise the governors of convict settlements to remit the sentences of transports. By the 8 Geo. IV. c. 54 (amended by 11 Geo. IV. and 1 W. 3 Will. IV. c. 60), consolidating the laws on the subject of transportation, the King in council was empowered to appoint 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 assignees, having the power of selling or hiring them out, and to cause them to be transported, the King in council 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 stat. 16 & 17 Vict. c. 67, for under sentence of death, but reprieved or respited, or under sentence of transportation, there remain to be transferred under the order of the secretary of state, or to others in his behalf, or for the benefit of their own home. These applications were usually called 'tickets of leave.' By the stat. 6 & 7 Vict. c. 7, the legislature, thinking it just that tickets-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 dis-astmetastate 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 stat. 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 other punishments in its stead. The statute of 1749, c. 28, s. 5, directed in all cases to substitute such penal servitude for transportation.

Before this last statute was passed, a system had for some time existed, by which in certain cases and on certain objections (when, although sentenced to transportation, had been kept at home), 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 only to cause serious evils, and 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 their expiration. The *Car. III.* c. 5, 5, & 6, made an act setting forth the statute empowers the Crown, by order of one 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 transportation, have no reference to penal servitude, s: that the name alone is changed.

**Sexual System, in Botany,** is the name given to the method by which Linnaeus arranged the Vegetable Kingdom. It was introduced at the close of the 18th century, and is represented by twenty-four classes, each of which is distinguished by the name and relative position of the stamens. The following are the classes:
I. Flowers with Staminodia and Pistils.

Class 1. Monandria; flowers with 1 stamen.

2. Diandra........ 2 stamens.

3. Triandra........ 3

4. Tetraandra........ 4

5. Pentaandra........ 5

6. Hexandra........ 6

7. Heptandra........ 7

8. Octandra........ 8

9. Enandra........ 9

10. Decandra........ 10

11. Dodecandra........ 12-19

12. Icosandra........ 20 or more stamens inserted into the calyx.

13. Polyandra........ 20 or more stamens inserted on the receptacle.


15. Tetradynamis........ 6 stamens; 4 long and 2 short. [Ceratopogon.]

16. Monadelphia; flowers with the filaments of the stamens united in one set.

17. Diadelphia; flowers with the filaments of the stamens united in 3 sets. (In this class the flowers are papilionaceous.)

18. POLYADELPHIA; flowers with the filaments of the stamens united in 3 or more sets.

19. Syngynedia; flowers with the authors of the stamens united [Collourae].

20. Gynandra; flowers with the stamens and pistils combined. [OCHIDACEES.]

11. The Stamens and Pistils on different Flowers.

21. Monoezia; flowers with the stamens and pistils on the same individual.

22. Dioecia; flowers with the stamens and pistils on different individuals.

23. Polynamia; flowers perfect and unisexual, on the same or on different individuals.

III. Fructification concealed.

24. Cryptogamia.

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 organised being as a means of arrangement, is, therefore certain to frustrate the great aim of the systematist, which is to establish a ground on which 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 from however fast falling into disuse; and our catalogues of plants and annuals 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 Monogyne, those with two in the order Digynia, with three in Trigynia, and so on. Thus the names of the orders are repeated in each of the thirteen classes, however other points of structure are adopted. In Didynamis the orders are two, according as the fruit is 4-lobed or capular. The first order is called Gymnosperma, and the second Angiosperma. These names were given by Linnaeus under the erroneous supposition that the 4-lobed ovary was a series of naked seeds.

The class Tetradymanis was divided into two orders, according to the form of the fruit, Siliaceas embracing the species with the fruit a siliceous, and Siliaceas those with a silique.

In the classes Monadelphia, Dioadelphia, 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 Decandria, class Monadelphia, and the order Decandria, class Dioadelphia.

With regard to Syngynedia the following plan will afford the best idea of the nature of the orders:

Order 1. Polynamia Equina. — Florets all hermaphrodites.

Order 2. Polygamia Superfusia. — Florets of the disc hermaphrodite, those of the ray pistilliferous and fertile.

Order 3. Polygamia Frutetana. — Florets of the disc hermaphrodite, those of the ray staminiferous.

Order 4. Polygamia Nectarosa. — Florets of the disc staminiferous, those of the ray pistilliferous.

Order 5. Polygamia Spergretiya. — Each floret having a separate involucr.


This large class thus divided by Linnaeus forms the natural order Composita, and has been recently subdivided in a much less artificial manner than in the orders above given. [Cornered.]

The class Gynandra was divided into orders by the number of the stamens. It includes the natural orders Orchidaceae and Aristolochiacæ.

The classes Monoezia 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

Dioecia, class Dioecia, etc.

The class Polygala has the following orders:—

Order 1. Monoezia. — Hermaphrodite, staminiferous, and pistilliferous flowers on the same plant.

Order 2. Dichogama. — Flowers on two plants.

Order 3. Tricyma. — Flowers on three plants.

The Cryptogamia were divided into the orders:

Filices

Musci

 Hepaticæ

Lichenes

Algae

Pungi

For the arrangement of the vegetable kingdom, according to which the Natural System, see the articles Exoes and Exoecæ.

SESSION 19. The statute 13 & 14 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 statute 11 & 13 Vict. c. 78, 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 13 & 13 Vict. c. 45, the powers previously given to Judges in 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 51. The statute 12 & 13 Vict. c. 10, makes further provision for the holding of petty sessions at new towns and places. By the statute 11 & 13 Vict. c. 43, and 14 & 16 Vict. c. 55. See further JUVENILE OFFENDERS, S. 2; JUSTICE OF THE PEACE, S. 2.

SEYBERITE. [MINERALOGY, S. 1.] SHAKHOVSKY, 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 1793, but in 1801 obtained the more congenial appointment of one of the directors of the theatre. The war of 1812 threw his life and fortune into the command of a regiment of Cossacks, but after its conclusion he resumed the duties of management. He retired with a pension in 1818, and died in 1846. During his lifetime Prince Shakhover was the most conspicuous of Russian dramatic authors, and was sometimes spoken of as the "Aristophanes of Russia." The number of his plays is loosely said to have approached a hundred; many of them were translations and adaptations chiefly from the French. Among them may be found a refashio of Shakepeare's "Love's Labour's Lost," and a recension of "A Lesson to Coquettes," are also of unusual merit. His vaudevilles and light comedies are considered his most successful efforts.

SHAP. [WESTMORELAND.]
SHARPE, DANIEL, F.R.S., at the time of his decease possessed of the degree of Honorary Fellow of the Geological Society of London, was born in London in 1806. His mother 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 work at it till 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 the new species of Ichthyosaurus, I. grandipes, which, however, it afterwards appeared had been previously described by Cuvier, under the same name. Throughout the greater part of his life, Mr. Sharpe was actively engaged as a merchant, and his business connection with the wine-growing districts of Portugal occasionally led him to Lisbon and Oporto. In 1839, he went 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 question of the relative position of the great coal strata on which Lisbon stands. The destructive effects of this shock were chiefly confined to the area occupied by the soft tertiary beds, while the buildings erected on the more solid Hippurite limestone and chalk escaped entirely. The same remark applies to the majority of the buildings Mr. Sharpe found to correspond precisely with the boundaries of the strata. In his third memoir Mr. Sharpe describes the granitic, gneissic, clay-slates, and coal-bearing rocks of Vallego near Oporto. The author, suspecting the porosity of its fossils to be of Lower Silurian age, and his sections show that the strata bearing anthracite coal underlie the slate, and rest on gneiss pierced by granite. He then concluded that the coal is of Lower Silurian age. In the obituary notice of Mr. Sharpe given in the 'Quarterly Journal' of the Royal Society for 1856, on which the present article 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 paleontologists to present characters indicative of 'carboniferous' age, and even those geologists who most strenuously support the so-called uniformitarian doctrine, incline to attribute the peculiar position of the coal to one of those great inversions of the strata so frequently 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 paleontological evidence. Long before the Portuguese geologist had been enabled to form a satisfactory idea of the skill and knowledge as a paleontologist, and on paleontological 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 for 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 fourteen papers to the Geological Society of London, on 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 Cumberland.' Part of this paper describes the range of the Carboniferous limestone. Mr. Sharpe identified it by its fossils as 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 to the Geological Society of London on the Old Red-sandstone rocks of the Sandstone Hills, inferred that the tilestones of South Wales should be withdrawn from the base of the Old Red-sandstone and classified with the Ludlow rocks, to which their fossils unite them. At a later period of the same year he produced a memoir titled 'On the Calcareous Limestone of the South of North Wales.' Up to this date it was believed that at Bala and elsewhere there was a great thickness of fossiliferous Upper Cambrian rocks of Sedgwick below the Lower Silurian strata. Mr. Sharpe maintained that these beds, which had hitherto been regarded as pre-Cambrian on account of the occurrence of fossils by their fossils, the Bala rocks were the equivalents of the Llandeilo flags and Caradoc sandstone. This magnificient determination has since been confirmed by Mr. J. W. Salter, F.G.S., as regards the Caradoc sandstone, the fossils of Bala being, it is now believed, the hinge of the South Shropshire opinions 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 the most important of the papers given in that year. The geological 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. Puruing 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 previously formed by Sir Humphry Davy and Sir Roderick Murchison, that the great 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 crystalline schistosity of the Old Red Sandstone rocks of North Wales, the North of England, the Highlands of Scotland, and Mont Blanc. In 1848, 1849, 1852, and 1864, he produced four memoirs on these subjects, the two first and the last of which were written in the 'Quarterly Journal' of the Geological Society, and the third in the 'Philosophical Transactions' of the Royal Society. These questions had been made the subject of special investigation by Professor Sedgwick, Mr. Darwin, and Professor Phillips.

It is on the subject of the slaty cleavage that Mr. Sharpe generalized too largely; and though this may be the case, the most interesting and instructive part of the memoirs 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. C. 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 cleavage. In the communication of 1846, 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 sheared and elongated in the planes of cleavage. He also recognizes the fact that, as to cleavage, as truly and fully explained by Mr. Sorby, in the 'New Edinburgh Philosophical Journal,' that the fine particles composing the slaty rocks are arranged lengthwise in the direction of the cleavage, so that a cleaved and tissed rock 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 crystalline action he altogether repudiates. It must be admitted, however, that the investigations of Mr. H. C. Sorby have been most valuable and instructive in the study of the relations of crystallisation to the greater structures of rocks. We are at present uninformed whether there are or are not jointed structures on the great scale, resulting from the coincidence of a number of rocks. It is manifestly true that the phenomena exhibited by the sub-carboniferous limestones and by certain serpentines, tend to indicate. The two last of the series of Mr. Sharpe's papers on these subjects, published in 1853 and 1854, describe respectively the slaty and cleaved and tissed rocks of the sandstones of Scotland, and are chiefly devoted to the development of his theory of the great 'cylinders' or arches, in which he asserted that the lenses of cleaved and foliated rocks lie. In these memoirs he made a most valuable contribution to the science of geology, in explaining the phenomena of cleavage and foliation to the same scale and under the same conditions as in the fine rocks of the British Islands. The author of the paper also, 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 scatcely considered, but which has ceased to be matter of surmise, and which seems not far distant. In the paper on Mont Blanc however Mr. Sharpe explains and corrects for the first time, we believe, the remarkable error of Saurousse, in representing the
clysage of slates, wherever they occur in the Alps, almost invariably as stratification; having mistaken the planes of clysage for those of bedding, and regarded the latter as a series of parallel joints. But while showing that this systematic error was made, and the manner in which it was afterwards corrected, he also shows also that Sausse'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 clysage of the slate, and the foliation which is observed in the same volumes, he shows also that Sausse's observations, even when his conclusions are erroneous, are always accurate and instructive.

Anxious however to acquire a wider reputation, he, in 1786, came to London. Here he found in Edmund Burke a kind friend and adviser. Burke introduced him to Sir Joshua Reynolds, who treated him with much cordiality. Mr. Shee being entered as a painter, went at once to Rome, and returned to Brux half a century later. This change of residence was attended with an improvement in his professional standing. He had a good many portraits of the leading actors, and of the other noted politicians of the day, in the collection of the Academy. He was also engaged in the portrait painting of the Punic Wars, which Bonaparte had collected in the Louvre; and besides that, his biographer finds little to notice until he appeared before the public in the character of a poet, by the publication, in 1808, of his 'Rhymes on Art, or the Reminiscences 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 or two from it; but its vitality has long since departed, though it has an easy flow of rhyme, and is not without more substantial merits, and the notes are occasionally valuable. Again—on churchmen and the like subject of the 'Roman and Gothic Monuments being exhibited at the British Institution, and a 'Commemoration dinner' in honour of Sir Joshua being given by the directors of the institution in May 1833, at Will's Rooms, the prince regent presiding—Mr. Shee invoked the muse, and the result was a poem, entitled 'The Commemoration of Sir Joshua Reynolds, and other Poems.' His next appearance as an author was under, to himself, more exciting circumstances. He had written a tragedy called 'Alas,' the principal character of which he seemed to be particularly suited to the historic poems of his friend Kebble; who agreed to act it. But it happened to be the first tragedy which fell under the hands of Colman, the new licenciate of plays, and he regarding himself as the abettor of all licence of thought and utterance, refused to admit into the play, and the play was put on at the Lyceum, with a certain amount of declamation about liberty, and denunciations of despotism, as well as one or two explorable actions of these the author as resolutely refused to submit, and appealed to the Lord Chamberlain himself against the decision of his deputy. But the chamberlain (the Duke of Montrose) declines to examine that on which his deputy had 'reported,' and, instead, he concludes, with the following note: 'I do not conclude, that at this time, without considerable omissions, the tragedy should not be acted.' Shee however was not about to be silenced, and resolved to shame his censors by printing his tragedy, though it was not allowed to be performed in public. It was printed in secret, and the play is supposed to have been performed in a place 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 was referred to by writers of literary and political history in situations suitable to the

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of what was prohibited as politically dangerous in London so late as 1834. The censor certainly did his work carefully. Tresson 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 abundant tool of state, some stab, his blust, unsanctioned,"

is thought to bode mischief, and is expanded accordingly. This was Shee's latest 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-mentioned fashion as a portrait painter. By 1833, he was already recognized as an artist of the first rank. The mantle of Reynolds had not fallen on his successor, but Lawrence's easy gracefulfulness of style concealed his deficiencies from the eyes of his contemporaries, and he reigned in undisputed supremacy. But Lawrence could not alone satisfy 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 therefore 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 comparison between the one in whose power of the two men, the academicians felt that Shee's fluency of speech and courtly address were of far more consequence in the academic chair than more eminent artistic abilities with reserved manners and falling hairs. Shee was not by any means 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 1844, in which year he exhibited for the last time five 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 has 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 characteristic. But his colour is often pleasing though too florid, and his figures have an air of ease and refinement; and his portraiture preserved the portraits of many of the more eminent of his contemporaries. He occasionally painted historical figures and fancy subjects, but none of them won much attention. He was an accomplished gentleman rather than a great painter.

Mr. Shee was a member of both the commissions (1838 and 1843) for the restoration of the standards of measure and weight, destroyed by fire in 1834. The standard of measure in the hands of Mr. Shee was a Professor of the Royal Astronomical Society of Great Britain (Francis, S. L.), at whose death Mr. Shee was from 1838 to 1844) to continue the restoration. This matter occupied him closely during the last eleven years of his life. It would not be possible to give any detailed account of the operation, a full history of which is expected from Mr. Airy. It need only be said, that after a thorough examination of the process, beginning with the very construction of thermometers, — a point which gave no small trouble — he concluded that the scale on the model of the inch was perfectly just. He deposited the bill (18 & 19 Vict. cap. lxxiv.) which received the royal assent on the 30th of July, 1855, the day following that on which Mr. Shee was struck by the shock which ended his life. The number of recorded micrometer observations is just five hundred short of a thousand. He had given a succinct but very satisfactory account of the operations for the production and verification of the new standard, in the Report of the Commissioners, for March 28, 1854, which was not long after his death had become public.

It has been recorded on adequate authority that Mr. Shee was especially distinguished by the integrity of his mind, and by his utter renunciation of self in all his pursuits. He did not court fame, it was enough for him that there was no dishonour in the work he did, should his whole life be useful to his country. 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.
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contented in defence of truth and justice, as they appeared to his mind.


SHELBURNEX. (Nova Scotia.)

SHELBURNE. (Nova Scotia.)

Sheil, 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 at that religion at the Jesuit College in Dublin. Sheil's father's means through a dissaisnace partnership caused a change in his destination, and he returned to Ireland, where he was called to the bar in 1814. He defrayed the expenses of his years of study by the successful tragedy of 'Adelaide' in which Miss O'Neill performed, and by those of the 'Apos-
tate,' 'Bella'mira,' 'Evdane,' and 'The Huguenot.' About the same time he also contributed some 'Sketches of the Irish Bar' to the 'New Monthly Magazine,' then edited by Mr. T. Campbell, and published in London. Sheil gained credit as a writer and a speaker, he never hastily 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 greatest success on the platform 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 abut the doors of the learned profession. It was his fate to form a religious organization. It is not surprising therefore that he turned his attention to political and religious agitation. In 1822 he became an active member of the Catholic Association; and three years later was chosen in conjunction with the late Mr. Daniel O'Connell to plead in the House of Lords 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 act, and the act itself, that his voice was heard 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 1830, soon after the passing of the Repeal Bill, he introduced the resolutions expressing the sincere sympathies 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 and politician into one of the most popular and attractive speakers in the House of Commons, though the matter of his speeches never rose to a level with the brilliancy of illustration and flow 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 continued agitating for repeal, in which Mr. Sheil at first refused to join, but subsequently consented, considering, as his biographer, Mr. T. McCullagh 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, the Sheil. This was the Irish Coercion Bill, which was strongly opposed by most of the Irish members, among whom was Mr. Sheil, but a report became current that several of them had expressed a wish that it should be carried, "or there would be no living in Ireland," 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 agitation, confessed that he believed that he had been misrepresented. In the following year Mr. Sheil published a pamphlet, entitled '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 1839 he was offered office by Lord Melborne, the secretary of state for the colonies; at first the clerkship of the ordnance was spoken of, but ultimately 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 Senate of Ireland, the first Roman Catholic who was made a peer 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 1849, when the party in office was dismissed. In 1856 Sheil resigned credit as a writer and a speaker, he never hastily 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 greatest success on the platform 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 abut the doors of the learned profession. It was his fate to form a religious organization. It is not surprising therefore that he turned his attention to political and religious agitation. In 1822 he became an active member of the Catholic Association; and three years later was chosen in conjunction with the late Mr. Daniel O'Connell to plead in the House of Lords 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 act, and the act itself, that his voice was heard 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 1830, soon after the passing of the Repeal Bill, he introduced the resolutions expressing the sincere sympathies 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 and politician into one of the most popular and attractive speakers in the House of Commons, though the matter of his speeches never rose to a level with the brilliancy of illustration and flow 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 continued agitating for repeal, in which Mr. Sheil at first refused to join, but subsequently consented, considering, as his biographer, Mr. T. McCullagh 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, the Sheil. This was the Irish Coercion Bill, which was strongly opposed by most of the Irish members, among whom was Mr. Sheil, but a report became current that several of them had expressed a wish that it should be carried, "or there would be no living in Ireland," 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
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 1858, which is amended by stat. 18 & 19 Vict. c. 91; the next in importance, the Passengers' Act, 18 & 19 Vict. c. 110. The Act relating to bills of lading, and that conferring admiralty jurisdiction on the County Courts, have been repealed by stat. 18 & 19 Vict. c. 110. [See County Courts, § 1.] It would be quite impossible in this place 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 unavoidable necessarily.

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 that Act has been almost entirely superseded by the Merchant Shipping Act of 1858, by which the entire trade has been thrown open to vessels of all nations.

The Board of Trade exercises a general superintendence over all matters relating to merchant ships and seamen, and the carrying into execution of the statutes in force relating to these. For this purpose it appoints inspectors and master-mates, and appoints officers to report to the Board on the condition and efficiency of shipping and their machinery. These and all their 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.] SHIPLYRICKS AND LIFE-BOATS. That wrecks are numerous, is a fact well-known to a seafaring nation like ours. The Risk of marine insurance, apparently having 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 forewarned. A new mode of fixing the idea that some wrecks are occasioned by the want of scientific 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; and that others again result from the insubordination, carelessness, ignorance, or obstinate fatality of seamen; that a fourth group are due to the deficiency of light-houses, beacons, and breakwaters; and that the remainder are rather the result of wanton disregard than of any received to know that on the whole it was favourable, a fewer lives were lost and more were saved, than usual; yet still our coasts saw no fewer than 1143 wrecks of ships. The lives lost numbered 352 (in 1864 they amounted to 1650), and the vessels lost numbered 668, of which 209 were by life-boats, 512 by loggers, coast-guard boats, &c., 507 by assistance from shore with ropes, mortars-apparatus, &c., 243 by ships' own boats, and steam-vessels, and 5 by individual exertion of a life Saving Society member, happened on our 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 supply of means, which, to a good sense sufficient to check, to some degree, such disasters. In examining the details of the chart, it will be seen that, as usual, the line of coast between Dungeness and the Pentland Frith is the most fatal, and that the whole of the Tyne makes the unequalled precedence of all other places, in the number of black dots and stars opposite to its name; next come the mouth of the Tees and the mouth of the Wear. These three rivers may be taken as the representatives of the district whence three million tons of coal are brought by sea to London yearly, employing the services of several thousand collier ships, which sail to and fro, and add to the otherwise busy commercial trade of the Northumberland and Durham ports. The mouth of the Humber, the Suffolk coast between Yarmouth and Southwold, 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 wrecks; the Channel coast of Glamorgan, Pembroke, and Anglesea, Scotland, except in and near the Frith 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 more on our eastern seacoast; the total wrecks 313 were by collision, owing, in many cases, as the report states, to "bad look-out," "neglect to show light," "neglect of the rule of the road," &c.; and cases of collision continue to increase. One prominent cause of collision is stated to be the difference of knowledge existing between the masters and the men, standing by the showing of a single light, and a coloured one at the bow is recommended. The total estimated losses occasioned by these wrecks was 519,001l., and the amount recoverable by the insurance companies was 398,100l. The Board, in consequence, institute inquiries into the causes of the wreck in many cases, and, during the year the certificates of several of the captains and mates of the wrecked vessels were cancelled or suspended for drunkenness, carelessness, and incapacity.

Many inquiries into the causes of shipwreck have been instituted; and especially one by a Committee of the House of Commons, whence a voluminous report resulted. But public attention was perhaps more fully drawn to the subject by the Dean of Westminster, who, in 1860, offered a premium for the best method of being a safe pilot. By the method of fixing the idea that some wrecks are occasioned by the want of scientific 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; and that others again result from the insubordination, carelessness, ignorance, or obstinate fatality of seamen; that a fourth group are due to the deficiency of light-houses, beacons, and breakwaters; and that the remainder are rather the result of wanton disregard than of any
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, belts, rocket apparatus, and other means for the security of the life-boat service. The Society commenced a little work, in Numbers at twopence each, which, at intervals, gives an epitome of all that is worth knowing on this matter.

A deed was given by a Quarterly Reviewer to the Duke of Northumberland, in that he has established, at his own cost, at the principal stations on the coast of his native county, "life-boats of an improved construction, and supplied with all the necessary apparatus and appliances, for preserving human life in and on the sea," much to the satisfaction of the Society, inasmuch as it is on the smiling coast, favourably stimulating the humanity and activity of the neighbouring peasantry, and from which the tourist, without being unreasonably sentimental, may derive his share of satisfaction. The grave-yards which surround the striking ruins and picturesque churches of "mountains 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 tale—of brothers found lost in the same boat, or of fathers perished in a vain attempt to save his sons—of whole families, united in industry and affection, and unvindicated 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 fails to feel the struggles and their fate, and whose eye does not glint when he hears of the misfortune which has done all that on that dangerous coast can do to avert such catastrophes in future. The Quarterly Reviewer, No. 154, is too modest, however, to say that all has been done that can be done; this is to put a limit to man's ingenuity and forethought, which we should be sorry to omit until the desired end has been more fully attained.

As an example—of the means for preventing shipwrecks, or for saving the lives of those who may be endangered by them—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 from a wreck—alive, it is true, but deprived at once of all the necessities 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 subscription. The Society continues to thrive; and in that same year, three fishing-boats were lost in Mount's Bay, involving the death of 20 persons, and the sudden impoverishing of 7 aged persons, 12 widows, and 35 children. A sum of money was collected, and the usefulness 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 eulogous: 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 the amount of 30s. each in the defraying of the expenses of the agents of the Society;" but aid beyond this limit depends upon membership. All fishermen and mariners may become members by the payment of 2s. 6d. per annum. The Society affords temporary assistance to the widows, parents, and children of all such members as may have been drowned; and gives a gratuity to such members as, without losing life, lose or damage their apparel or boats by wreck or similar calamity. The longer the period during which a fisherman or mariner has been a member of the Society, the larger the gratuity allowed to his 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, as an example to the public, has a high claim to public description. As to the purely charitable part of the plan, it ranks with a multitude of other praiseworthy modes of helping those who cannot help themselves.

It was found, however, in the course of years, that two societies—bearing the titles "Royal Shipwrecked Institution," and "Shipwrecked Fishermen 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 1865, the latter-named body amalgamated with the former, which, among other things, held eight life-boat carriages; in order that one society might have the sole management of the life-boat department of those benevolent schemes; while the other might continue to attend to the wants of shipwrecked mariners, or their widows. The "National Shipwrecked Institution" at the same time changed its name to the "National Life-Boat Institution," to define more clearly the objects aimed at.

That there was a positive amount of good work rendered by the Life-Boat Institution is made manifest by the simple fact, that in 1867 alone the life-boats belonging to, or in connection with, the Institution, were those of saving the lives of 366 persons, 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>
<th>Lives Saved</th>
<th>Lives Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1824</td>
<td>124</td>
<td>1836</td>
<td>1845</td>
</tr>
<tr>
<td>1825</td>
<td>152</td>
<td>1837</td>
<td>1846</td>
</tr>
<tr>
<td>1826</td>
<td>175</td>
<td>1838</td>
<td>1847</td>
</tr>
<tr>
<td>1827</td>
<td>185</td>
<td>1839</td>
<td>1851</td>
</tr>
<tr>
<td>1828</td>
<td>301</td>
<td>1840</td>
<td>1852</td>
</tr>
<tr>
<td>1829</td>
<td>489</td>
<td>1841</td>
<td>1853</td>
</tr>
<tr>
<td>1830</td>
<td>372</td>
<td>1842</td>
<td>1854</td>
</tr>
<tr>
<td>1831</td>
<td>267</td>
<td>1843</td>
<td>1855</td>
</tr>
<tr>
<td>1832</td>
<td>310</td>
<td>1844</td>
<td>1856</td>
</tr>
<tr>
<td>1833</td>
<td>383</td>
<td>1845</td>
<td>1857</td>
</tr>
<tr>
<td>1834</td>
<td>214</td>
<td>1846</td>
<td>1858</td>
</tr>
<tr>
<td>1835</td>
<td>364</td>
<td>1847</td>
<td>1859</td>
</tr>
<tr>
<td>Total</td>
<td>10,475</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It may not be that these lives were all saved by the instrumentality of the Society; 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 target, or 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, 1865, were no less than 70 in number, and there are 76 others provided from various sources, and not in connection with the Society. Considering that the boats usually cost from 100l. to 200l. each, the boat-carriages about an equal sum, and the boat-houses about 100l., it will be seen that the amount of money thus sunk is something over 70,000l. The three counties form the three counties most liberally provided. These boats, on an average, appear to be about 30 feet long by 8 feet broad, 3 or 4 feet deep, weight 40 cwt., and are rowed by 8, 10 or 12 oars.

The life-boats above adverted to, are purposely 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. Greathed, of South Shields, constructed what may be deemed the original of all the life-boats since made. Cork was largely used in Greathed's boat to render it more buoyant; and since his time air-tight cases, formed of india-rubber cloth, have been a favourite feature in many of the inventions.

When the first model of the Royal Institution's boat, the prize was given to Mr. Beechings, of Yardley, in consideration 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 of oak, of the kind mentioned, and where 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 whereon to wheel the boat to the beach; and, in case of a vessel being stranded. 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 in this direction, quite as much as in the provision of life-boats and buoys, that the Life-boat Institution has rendered service. A system of service, 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 committees are so organized, that in many cases, there is no one else to be desired, 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, waves, shoals, reefs, rocks, &c. 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 sands. The vessels were ordered to be sent out at once, to be stationed in that 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 helpless 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 steam-tug and advanced towards the stranded 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 incoming tide favoured them a little; they went on; they ran on shore amid the woods of the master of the vessel, 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 thus got into the life-boat. As soon as the tide had risen sufficiently to allow the steamer to approach close to the ship, a small boat was sent over with a line, and a communication being thus established, she was enabled to lay out an anchor to leeward, and subsequently to get her own large tow-boat fast to the vessel. By means of these vessels was brought off from her dangerous position, and taken in a leaky 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 October 7th, 1854, signals of distress were observed in the direction of the Holm Sand, off the Suffolk coast, during a strong easterly gale. The Pakefield life-boat immediately put off, towed by the Lowestoft steam-tug, which was steaming into leeward, the boat weathered the sand, and then observed the sea breaking heavily over the ship, a Norwegian brig, of 180 tons. With some difficulty the boatmen succeeded in getting on board, where they found a crew of eight men, all dressed in their oilskins, menaced by drowning, and without the possibility of seeing their vessel got off, obstinately refused to leave. The boatmen, finding persuasion to be useless, and knowing that the life-boat itself was in a perilous position on the verge of the shoal, with the waves constantly breaking over it, returned to Lowestoft Harbour. At daybreak on the next morning, another crew from Pakefield manned the life-boat, and succeeded in reaching the vessel, where the crew, sobred during the night, and saved their lives, and the ship was saved without the possibility of being drowned, and without the possibility of seeing their vessel got off, obstinately refused to leave. The boatmen, finding persuasion to be useless, and knowing that the life-boat itself was in a perilous position on the verge of the shoal, with the waves constantly breaking over it, returned to Lowestoft Harbour.

There is no part of our maritime system, in which, in recent years, attracted more attention than that which has just been illumed. The qualities of 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 be all that could be desired, and yet the crew may be grossly ignorant in quantity—and yet one slight manifestation of indiscretion or of unskillfulness, may give room for a catastrophe which will plunge scores or hundreds of human beings into a watery grave.

This may be taken up by the Legislature many years ago; but it is now treated of 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 ships. There are times when other aid is needed; 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 familiar to all who have read of this subject. Captain 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 drowned, and sixty-year-old woman, A lady was saved from five or six hours on the wreck, without a possibility of receiving assistance. Long before this, he had thought on the subject. He had, in 1753, thrown a line, by means of a small mortar, over Downham Church, in Norfolk, and it was pulled up with a man in it; and he had afterwards thrown a line over a stranded vessel. During many subsequent years he made repeated experiments; his main difficulty consisted in securing the shot to the rope; iron chains were liable to break on the discharge; but at length he found that stout strips of closely-plaited rawhide would answer the purpose. In 1792 the Society of Arts gave a premium of fifty guineas to Lieutenant Bell for a "plan for throwing a rope on shore by means of a shell from a mortar on board a vessel in distress;" this plan was in practice at Lowestoft. Captain 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 miles from the land. What are the crew to do? 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. Captain Manby's plan was to get a vessel as long as 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 one the Snipe had. On February 19th, 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. In about four hours the man at the wheel hauled 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 proved 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 another which aimed at the same object. Whereby the attention of the Legislature was drawn to the subject of wrecks and life-saving apparatus; and when he died at a venerable age in 1854, he left behind him a name worthy of the gratitude of society.

It must be observed, however, that the benevolent efforts which have been made to save lives have been only made by means of the ropes thrown out to stranded ships, through the agency of mortar-rockets. There are 198 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 degree of improvement which has been made in this branch of useful art. The first was a model life-boat and carriage, as now adopted by the Institution, and stationed on many parts of our coasts; the boat, invented by Mr. Peake, of Lowestoft, is 32 feet long, 4 feet 7 inches wide, and 32 feet deep; it is considered to possess, in a high degree, seven qualities required in a life-boat—terrific vortex, line of attack, and safety of those on board. The launching and beaching, quick self-discharge of water, the 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. Beeching, of Yarmouth, with the prize of 100 guineas, the model life-boat, invented by Mr. Peake, of Lowestoft, 32 feet long, and 3 feet 7 inches wide, and 2 feet 9 inches deep, designed by Mr. Peake, 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 of France. A
fourth was Mr. Ward Jackson's life-boat, such as is stationed at the West Harlilpool Docks. Besides these boats there were several minor articles, such as trav-lin life-buoys, to be used with the rock-boat and mortar apparatus; corck life-boat and life-buoy; and a number of other things. We have now to notice the recent law concerning shipwrecks. 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 and just assertion of a principle, by the government departments always do the right thing at the right time; but it seems especially fitting that the legislature, and through it the executive, should have a voice in the development of a maritime economy of a maritime nation. Mr. Cardwell brought forward his bill, the number and concerning the Board of Trade; the management and tolls of lighthouses; the constitution of the Mercantile Marine Fund; the laws relating to wrecks, casualties, and salvage; the liabilities of shipowners; the procedure in the event of misdemeanor; and miscellaneous maritime laws. The Board of Trade, being in charge of the wrecks and accidents, are to be appointed by the Board of Trade; new examinations for masters and mates are to be organized, separating formal to correspondence; the arrangements for the boats to accompany all trading ships are described; every ship carrying more than ten passengers must be provided with a life-boat, or an ordinary boat rendered buoyant, and with two life-buoys—these and all the life-saving appliances being always kept ready for use; lights and fog-signals are to be supplied, may be supplied by the Admiralty; iron steamers must have water-tight compartments, and safety-valves beyond the control of the engineer; sea-going ships must be provided with fire-engines and hose, signal-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 happen to have occurred. As these arrangements are some-
what specimens of the general superintendence of the Board of Trade, by whom 'Receivers of Wreck' are to be appointed. These receivers will have their charge for the width and extent of the wreck, 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 murder. 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 right to claim a certain substantial and reasonable amount of salvage. Numerous directions are given for ascertaining what would be a "reasonable amount" in each case; for enforcing the claim of the salvor against the dietrainor; 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 re-
cected from the owners of life-boats, and also fees paid connected with merchant-ships; lighthouse dues accruing by virtue of certain sections of the Act; rates accruing from haggate and ballastage in the Thanes; and fees derived from the inspection of merchant-ships. All these derive from her Majesty's Paymaster-General, is employed in pay-
ment of the salaries of examiners, surveyors, receivers, &c.; expenses in regard to lighthouses, buoys, beacons, haggate, 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 proc-ed, early in 1855, to give effect to its provisions. Among other steps, the Board addressed a Circular to the life-saving committees through 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 "right and just assertion of a principle." In many of these cases many of those persons might have been rescued had there 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 be restricted by sectionalism, but to be established as a law which 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 super-
" 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 super-
fittings ascertained; and if, from any cause, the greater part of her ordinary crew are absent, she had nevertheless better be taken afloat by any other of the seamen of the port who may be obtained, but always, if possible, in charge of the permanent coxswain of the boat. The salary of the coxswain is double that which has previously been paid by this institution. In return, it will be expected that they shall devote the more time and attention 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 bestow such services of a mercenary character.

Under this Act, in 1857, the Board of Trade paid a total sum of £2,000 for rewards, pensions, &c., and for maintaining the Rocket and Mortar Apparatus.

SHIRE. See County Courts, S. 2, p. 158. 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 island has been described in vol. xxi., 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 Square Miles</th>
<th>Districts</th>
<th>Counties</th>
<th>Population in 1851</th>
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<tbody>
<tr>
<td>Palermo</td>
<td>1594</td>
<td>4</td>
<td>72</td>
<td>514,717</td>
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<tr>
<td>Messina</td>
<td>1356</td>
<td>3</td>
<td>116</td>
<td>245,364</td>
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<td>Catania</td>
<td>1301</td>
<td>3</td>
<td>21</td>
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<td>45</td>
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<td>237,814</td>
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<tr>
<td>Trapani</td>
<td>1358</td>
<td>3</td>
<td>21</td>
<td>182,809</td>
</tr>
<tr>
<td>Catania</td>
<td>1190</td>
<td>3</td>
<td>8</td>
<td>180,781</td>
</tr>
<tr>
<td>Total</td>
<td>10,536</td>
<td>22</td>
<td>407</td>
<td>2,093,580</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>Ammonoida.</th>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrothoracoceras (f)</td>
<td>1 Chemidium</td>
<td>1</td>
</tr>
<tr>
<td>Chorda</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

FORAMINIFERA.

Eudobyta.

Zooplankton. (Zoantharia of Edwards.)

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrothoracoceras</td>
<td>1 Goniophyllum</td>
</tr>
<tr>
<td>Axostichus</td>
<td>4 Halysites</td>
</tr>
<tr>
<td>Archim bromophyllum</td>
<td>1 Haliclystis</td>
</tr>
<tr>
<td>Aulacophyllum</td>
<td>1 Patella</td>
</tr>
<tr>
<td>Austrophia</td>
<td>1 Pteropoma</td>
</tr>
<tr>
<td>Cretaceous</td>
<td>4 Protovirgulina</td>
</tr>
<tr>
<td>Ostracoda</td>
<td>1 Saccinula</td>
</tr>
<tr>
<td>Ostracophyllum</td>
<td>1 Sponpora</td>
</tr>
<tr>
<td>Orinices</td>
<td>5 Sphenodes</td>
</tr>
<tr>
<td>Ostracohyza</td>
<td>1 Stromatopoma</td>
</tr>
<tr>
<td>Ostracodythyl</td>
<td>5 Strombodes</td>
</tr>
<tr>
<td>Ostracodophyllum</td>
<td>4 Synegopora</td>
</tr>
<tr>
<td>Diaphyllum</td>
<td>1 Theca</td>
</tr>
<tr>
<td>Fossilifer</td>
<td>7 Zaphrentes</td>
</tr>
<tr>
<td>Fossilifer</td>
<td>8</td>
</tr>
</tbody>
</table>

ALCORNARIA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didymogenus</td>
<td>3 Graptolithus</td>
</tr>
<tr>
<td>Diplograptus</td>
<td>10 Rastisites</td>
</tr>
<tr>
<td>Gorgonia</td>
<td>4 Radiolites</td>
</tr>
</tbody>
</table>

HYDRODIA.

Spec. | Spec.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudomusa</td>
<td>6 Murexepictus</td>
</tr>
<tr>
<td>Crotalocefe</td>
<td>1 Pteriochirius</td>
</tr>
<tr>
<td>Cylindromia</td>
<td>3 Sayenium</td>
</tr>
<tr>
<td>Euchalymon</td>
<td>3 Sabrinus</td>
</tr>
<tr>
<td>Glycyotheca</td>
<td>1 Paramurex</td>
</tr>
<tr>
<td>Hyalophilus</td>
<td>1 Teregonis</td>
</tr>
</tbody>
</table>

ECHINODERMATA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinoeca</td>
<td>4 Murexepictus</td>
</tr>
<tr>
<td>Crotalocefe</td>
<td>1 Pteriochirius</td>
</tr>
<tr>
<td>Cylindromia</td>
<td>3 Sayenium</td>
</tr>
<tr>
<td>Euchalymon</td>
<td>3 Sabrinus</td>
</tr>
<tr>
<td>Glycyotheca</td>
<td>1 Paramurex</td>
</tr>
<tr>
<td>Hyalophilus</td>
<td>1 Teregonis</td>
</tr>
</tbody>
</table>

CRYPTODIOCA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agelacrinus</td>
<td>1 Echinocochus</td>
</tr>
<tr>
<td>Aplacostoma</td>
<td>1 Hemicochus</td>
</tr>
<tr>
<td>Caryocochus</td>
<td>5 Prudreacochus</td>
</tr>
<tr>
<td>Echinonemia</td>
<td>2 Pseudocochus</td>
</tr>
</tbody>
</table>

ARTICULATA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lepidostoma</td>
<td>1 Urether</td>
</tr>
<tr>
<td>Procerus</td>
<td>1</td>
</tr>
</tbody>
</table>

ECHINODAIRIA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palacinus</td>
<td>1</td>
</tr>
</tbody>
</table>

AMPHIOZA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambonius</td>
<td>1 Nerites</td>
</tr>
<tr>
<td>Cornutus</td>
<td>1 Serpulites</td>
</tr>
<tr>
<td>Cretosoma</td>
<td>2 Sponpora</td>
</tr>
<tr>
<td>Lumnularia</td>
<td>2 Tentacules</td>
</tr>
<tr>
<td>Myrionota</td>
<td>1 Trichoderm</td>
</tr>
<tr>
<td>Myrionota</td>
<td>1</td>
</tr>
</tbody>
</table>

BRACHIOPODA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathyria</td>
<td>6 Chondrites</td>
</tr>
<tr>
<td>Brytes</td>
<td>9 Orania</td>
</tr>
</tbody>
</table>

Entomostraca.—Thalassemia.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acisidias</td>
<td>10 Harpes</td>
</tr>
<tr>
<td>Aplagina</td>
<td>2 Homalostes</td>
</tr>
<tr>
<td>Aquaticus</td>
<td>4 Illeocidium</td>
</tr>
<tr>
<td>Amphion</td>
<td>1 Lichas</td>
</tr>
<tr>
<td>Ampyx</td>
<td>5 Oggia</td>
</tr>
<tr>
<td>Amphus</td>
<td>7 Oligochaeta</td>
</tr>
<tr>
<td>Brotius</td>
<td>2 Paradoxides</td>
</tr>
<tr>
<td>Calymen</td>
<td>6 Thaeropus</td>
</tr>
<tr>
<td>Chelcerus</td>
<td>4 Protius</td>
</tr>
<tr>
<td>Cenoceratida</td>
<td>1 Renipora</td>
</tr>
<tr>
<td>Cythara</td>
<td>2 Spharellachus</td>
</tr>
<tr>
<td>Cythera</td>
<td>1 Sperochatus</td>
</tr>
<tr>
<td>Cytharia</td>
<td>1 Synca</td>
</tr>
<tr>
<td>Cythera</td>
<td>1 Tereclusa</td>
</tr>
<tr>
<td>Echiothiope</td>
<td>1 Trinucleus</td>
</tr>
<tr>
<td>Echinodermata</td>
<td>4</td>
</tr>
</tbody>
</table>

Other Entomostraca.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bregchia</td>
<td>3 Euryceras</td>
</tr>
<tr>
<td>Ceratoconus</td>
<td>3 Hymenoceratida</td>
</tr>
<tr>
<td>Ostracoceratida</td>
<td>1 Lepidoceratida</td>
</tr>
<tr>
<td>Dicytidea</td>
<td>1 Pterygotheca</td>
</tr>
</tbody>
</table>

BRACHIOPODA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collapora</td>
<td>1 Heteropora</td>
</tr>
<tr>
<td>Ceramopora</td>
<td>5 Intactia</td>
</tr>
<tr>
<td>Dicytidea</td>
<td>2 Oldhania</td>
</tr>
<tr>
<td>Diplopore</td>
<td>3 Paleoceratida</td>
</tr>
<tr>
<td>Echinocyathus</td>
<td>1 Plagiocythina</td>
</tr>
<tr>
<td>Fenestella</td>
<td>6 Retepora</td>
</tr>
<tr>
<td>Glaucoceratida</td>
<td>1</td>
</tr>
</tbody>
</table>

BRYOZA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collapora</td>
<td>1 Heteropora</td>
</tr>
<tr>
<td>Ceramopora</td>
<td>5 Intactia</td>
</tr>
<tr>
<td>Dicytidea</td>
<td>2 Oldhania</td>
</tr>
<tr>
<td>Diplopore</td>
<td>3 Paleoceratida</td>
</tr>
<tr>
<td>Echinocyathus</td>
<td>1 Plagiocythina</td>
</tr>
<tr>
<td>Fenestella</td>
<td>6 Retepora</td>
</tr>
<tr>
<td>Glaucoceratida</td>
<td>1</td>
</tr>
</tbody>
</table>

BRYOZA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collapora</td>
<td>1 Heteropora</td>
</tr>
<tr>
<td>Ceramopora</td>
<td>5 Intactia</td>
</tr>
<tr>
<td>Dicytidea</td>
<td>2 Oldhania</td>
</tr>
<tr>
<td>Diplopore</td>
<td>3 Paleoceratida</td>
</tr>
<tr>
<td>Echinocyathus</td>
<td>1 Plagiocythina</td>
</tr>
<tr>
<td>Fenestella</td>
<td>6 Retepora</td>
</tr>
<tr>
<td>Glaucoceratida</td>
<td>1</td>
</tr>
</tbody>
</table>
semimetal; they are found near the surface, where the rock has undergone partial decomposition. The sulphates of lead, iron, and copper, of the mining region, generally contain silver, and are also worked. (Dana.)

The principal mines of silver in Europe are those of Spain, of Kongsberg 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>Pounds Troy</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Isles</td>
<td>7,900</td>
</tr>
<tr>
<td>France</td>
<td>4,150</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>120,000</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>1,850</td>
</tr>
</tbody>
</table>

making in all 286,150 troym pounds, or about 4,600,000 dollars annually. With the sum from Russia, about 720,000 dollars, it becomes 5,330,000 dollars a year. This is small compared with the amount from America, which at the beginning of the present century equalled 2,100,000 pounds, or $314 millions of dollars, nearly six times the above sum; and it is probable that these mines will again yield this amount when properly worked. The whole sum from Russia, Europe, and America, makes nearly 2,000,000 pounds avoidance.

SIMCOE. [ CAMADA, S. S.]

SIMETHIS, a genus of Plants belonging to the natural order Liliaceae, and the tribe Antirrhineae. 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 Bourne-mouth, in Dorsetshire. It has also been found at Derryman, 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.

SIMIADE. 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>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chimaera</td>
<td><em>Chimaera</em></td>
</tr>
<tr>
<td>Echidna</td>
<td><em>Echidna</em></td>
</tr>
<tr>
<td>Erinyes</td>
<td><em>Erinyes</em></td>
</tr>
<tr>
<td>Fossa</td>
<td><em>Fossa</em></td>
</tr>
<tr>
<td>Icthyophaga</td>
<td><em>Icthyophaga</em></td>
</tr>
<tr>
<td>Latrodectus</td>
<td><em>Latrodectus</em></td>
</tr>
<tr>
<td>Notonecta</td>
<td><em>Notonecta</em></td>
</tr>
<tr>
<td>Ophiura</td>
<td><em>Ophiura</em></td>
</tr>
<tr>
<td>Ophion</td>
<td><em>Ophion</em></td>
</tr>
<tr>
<td>Phalacrocorax</td>
<td><em>Phalacrocorax</em></td>
</tr>
</tbody>
</table>

Of the above list, 496 were found in the Upper Silurian; 4,835 in the Lower Silurian; and 19 in the Cambrian.

SILVER. The ores from which the silver of commerce is mostly obtained are the Vitreous Silver, Brittle or Black Silver-Ore, Red Silver-Ore, and Horn Silver, in addition to Native Silver. Besides these, silver is obtained in large quantities from galena (lead-ore), and from different ores of copper; and some galenas are so rich in silver that the lead is neglected for the more precious metal. This metal occurs in rocks of various ages, in gneiss, and allied rocks, in porphyry, trap, sandstone, limestone, and shale; and the sandstone and shales may appear as recent as the middle secondary, as is the case in Prussia. The silver-ores are associated often with ores of lead, zinc, copper, cobalt, and antimony, and the usual gangue is calcite or quartz, with frequently fluor spar, or silver spar. The Silver of South America is derived principally from the Horn Silver and Brittle Silver-Ores, including Arseni-ursted 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 Pacas, which are mostly earthy oxide of iron, with a little dis-
The Five-Fingered Mirik (Brochylides arachnoidea; Simia arachnoidea, Humb.). Tropical America.

The Miriki (B. hypocoecus). Tropical America.

The Caparru, or Negro Monkey (Lagopus Humboldtii, Geoff.). Brazil.

The Aguaruko, or Brown Howler (Myocetes urinus). Guiana, Brazil.

The Golden Howler (M. Simia, Kuhl.; Simia Simia, Linn.). Royal Monkey, Penn. (Alouatta, Raff.). Brazil.

The Caraya, or Black Howler (M. Caraya; Simia Caraya, Humb.). Brazil.

The Guara, or Yellow-Headed Howler (M. Beddouzel; Simia Beddouzel, Linn.). Brazil.

The Tuffed Capuchin (Cebus cirrifer, Geoff.). Brazil.

The Kite, or Horned Capuchin (C. Fatusius, Erzl.). Brazil.

The Capuchin (C. Apella, Erzl.; Simia Apella, Linn.). Brazil.

The Hieron, or Yellow-Chested Capuchin (C. xanthothenor). Brazil.

The Sai, or Weeper (C. Capucinus, Erzl.; Simia Capucinus, Linn.). Brazil.


The Yellow Sappajou (C. gracilis, Spix). Brazil.

The Golden-Headed Sappajou (C. circeus, F. Cuv.). Brazil.

The Tee-Tee (Callithrix sciureus, Kuhl.; Simia sciurea, Linnaeus). Brazil.

The Schauaau, or Masked Tee-Tee (C. peronndae, Kuhl.). Brazil.

The Oiabasso, or White-Headed Tee-Tee (C. Moloch, Geoff.). Brazil.

The Collared Tee-Tee (C. torquatus, Hoffm.). Guiana, Brazil.

The Cuxio, or Bearded Skai (Brochylurus Satanus; Cebus Satanus, Hoffm.). Guiana, Brazil.

The Yakes (Pithecia irrorata, Gray). Brazil.

The Black Yarke (P. leuccephalus, Geoff.). Brazil.

The Whiskered Yarke (P. poconus, Gray). Brazil.

The Dourocoui ( Nycticebus trivirgatus, Gray). Brazil.

The Vitoe (M. felinus, Spix). Brazil.

The Marmoset (Jacchus vulgaris, Geoff.). Brazil.

The Quick-Guark, or Black-Eared Marmoset (J. capucinus, Geoff.). Brazil.

The White-Eared Marmoset (J. auritrus, Geoff.). Brazil.

The Tamarin (J. Midas; Simia Midas, Linn.). Brazil.

The Black Tamarin (J. Tamarin; Cebus Tamarin, Link). Brazil.

The White-Whiskered Tamarin (J. labitatus, Desm.). Brazil.

The Marikina (J. Rosalia; Simia Rosalia, Linn.). Brazil.

The Finches (I. Eisopus, Desm.; I. Eisopus, Linn.). Brazil.

The following forms of Simiades and Cebidae were existing in the Gardens of the Zoological Society, Regent's Park, between the years 1847 and 1852:

Simiades.

Simia Satyrus, Hylobates Hoolook, Semnopithecus Galenus.


SIP
687
SIPRONOSTOMES. [Scoticia craca.ens].
SIPUNCULOIDEA, an order of Echinoedematous Animals, embracing the families SIPUNCULIDAE, Priapulidae, and Thalassembridae. This order is defined as follows: The cutaneous envelop is conspicuous and free from calcareous corpuscles; there is no calcareous ring about the oesophagus; the body is cylindrical; the digestive canal usually asymmetrical.
1. The SIPUNCULIDAE (Syphon-oncorn) have a retractable proboscis about as long as the body, and a circle of simple linear 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. Barsei.
2. The PRIAPULIDAE (Tailed-Worms) have a retractable proboscis 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. Johnstoni, S. sacculus, S. tellinum, S. Forseni, S. granulosus, S. punctatus, and S. Palliatus.
3. Thalassembridae (Squid-Worms) have a body oval or oblong, with a long flabby appendage; vent at posterior extremity, tentacles none.
Thalassembrus (Cuvier) has a cylindrical body rounded and smooth behind; the proboscis retractile, short, furnished at one side with a long flabby worm-like head, which is not retractile. T. Nepigatus is a British species.
Echinarus (Cuvier) has a cylindrical body, set at its hinder extremity with four points, and a proboscis as in Thalassembrus.
[ECHINODERMATA; THALASEMA.] E. ocellatus is found in the Channel
(Monograph of Natural History; Gowe, Marine Zoology; Forb's, British Star-Fishes.)
SISMONDINE. [Minerajogy, S. J.]
SIITSOVA, a town in Bulgaria, is situated on a height above the right bank of the Danube, 27 miles above Rutsch-
schuk, and 25 miles below Nikolipol, and has about 21,000 inhabitants. The town is defended by a citadel, and inclosed by a dry ditch and palisade. The houses are low and ill-built. The mosques of which there are eight, are the only buildings now of considerable commercial, and is looked upon by the Bulgarians as their proper capital. In ordinary times it has a good trade in corn, hides, leather, foreign manufactures, and colonial pro-
ductions. The books and Austrains concluded a peace at Siatova in 1791.
SISMIHIUN. [Indiace.]
SIVATHEERUM (from Siva, an Indian deity), a genus of extinct animals belonging to the family of Elephasidae. The remains of species of this remarkable genus were found by Dr. Falconer and Colonel Caytel in the valley of Mack-
anda, in the Sewalk Hills of the Himalaya.
Two species of this genus, S. giganteum and S. Permense, have been described. A cranium, lower jaw and teeth, and some bones of S. giganteum are now in the British Museum. The skull of this animal is nearly as long as that of the Elephant, the neck was shorter and stronger than in the Giraffe. The posterior portion of the skull is greatly developed, and form of cellular cavities, as in the Elephant. "The face is short, and the nasal bones are remarkable for the manner in which they are prolonged into a pointed arch above the external nostrils, indicating a trunk, or proboscis. The very inclined direction of the front of the face is, and of the upper jaw, shows the animal was constructed for a physiognomy altogether peculiar. Two horns arise from the brow between the orbits, and diverge from each other, and is probable that the posterior protuberances of the fons also supported a pair of short massive horns."
(Mantell.)
When living, the Sivatherium must have resembled an immense Omu, or Antelope, with a short thick head sur-
mounted with two pairs of horns. The front pair of these horns were small, whilst those behind were probably pal-
mated. The eyes were small, and it had a nasal proboscis, an organ unknown amongst the Ruminantia.
(Mantell. Portefield and their Teachings; Journal of the Asiatic Society.)
SKATES. [Raiden, S. 2; Skata.]
SKENE, a genus of Gasteropodous Mollusca, named after Dr. Skene. The shell is very small, flat, and with few whorls. It is deeply umbilicated; the mouth is entire, circular, not produced, and connected with the pharynx by a pericardium rather spiral. The animal is nearly like that of Rissoa, and has large eyes. The species are few, and are found generally on the rocks of CornuYas officinalis.
SKIBBE, a town in Ireland, a market-town and the seat of a Poor-Law Union, is situated on the river Luan, in 51° 34' N. lat., 9° 16' W. long., distant by road 52 miles S.W. from Cork, and 201 miles S.W. from Dublin. The population in 1851 was 3806. Skibbereen Poor-Law Union comprises 28 electoral divisions, with an area of 115,000 acres, and a population in 1851 of 38,069. The town contains a churh, chapels for Roman Catholics and Wesleyan Methodists, two National schools, a court-house, a post-office, dispensary, bridewell, and Union workhouse. In the town are flour-mills and a brewery. Quarter and petty sessions are held. There are six yearly fairs, at which large quantities of yarns and coarse linens are sold.
SKULLCAP. [Scullaria, S. 1.]
SLATE. Slate is a harder and more compact variety than the common slate, of bluish and purplish shades of colour. The best slates come from Spain, Italy, and France. A good quality is quarried in Maine and Vermont, United States.
Novaculite, Home-Slate, or What-Stone, is a fine grained slate, containing considerable quartz, though the grains of this mineral are not perceptible. It occurs of light and dark shades of colour, and compact texture.
Argillite is a general term given to argillaceous or clay-
slate rocks. Some clays resemble slate, but are more friable; others crumble easily, and are unfit for any purpose in the arts, except to furnish a clayey soil.
Aramid Slate is any slate rock which contains decomposing pritties, and thus will afford alum or sulphate of alumina on lixiviation.
Bituminous Slate is a dark coloured slaty rock containing some bitumen, and giving off a bituminous odour.
Pumaginous Schist is a clay slate containing phumage or graphite, and leaving traces of black lead.
The Pipestone of the North American Indians was in part a red claystone or compacted clay from the Coteau de Prairies. It has been named Cattinise. A similar material, now accumulating, occurs on the north shore of Lake Supior, in the region around Neipigus. Neipigus is a trading-post, and is considered a valuable mine of graphite; hence the name. It is used by the Indian tribes both as a flint and as a neophyte tool.
SLEEMAN, SIR WILLIAM HENRY, K.C.B., the son of Philip Slemen, Esq., and grandson of Mr. John Slemen, died 27th December, 1788. In 1806, he became a cadet in the East India Com-
pany's service at Bengal. He served in the Nepaeulose war of 1812 with distinction; and at its conclusion being laid up with an illness which disqualified him for active employment, he spent fifteen months at the College of Fort William, during which time he made himself master of the history and language of the natives, and prepared himself for a career of future usefulness. In 1816 he commenced his service to Lord Moira (afterwards Marquis of Hastings), then Governor-General of India, who engaged him in an inquiry into the claims arising out of the war in Nepaul, and in 1820 was appointed agent in the Saugar and Nerbudda districts. Here he employed his energies in the extinction of the atrocious systems of Thuggee and Dacoty, on which he wrote several able pamphlets; he at the same time produced a larger work, entitled 'Military Discipline in our Indian Army.' In 1842 he was commissioned by Lord Ellen-
borough to report on the condition of Bondelucia; and in 1849 he was sent to the United States, to see that the variety of pipes in the hands of Lord Dalfouse, who employed him in preparing for the reduction of Oude under British laws. As a proof of the necessity for adopting strict measures, it should be men-
tioned that while residing at Delhi, he intercepted a letter sent from the King of Persia to the King of Oude, in which the former spoke hopefully of a Persian invasion of India, and proposed in that event to secure to him his throne, on condition of betraying the English into his hands. He also wrote a 'Treatise on Political Economy,' and a 'Review
and Analysis of the Peculiar Doctrines of the System of Political Economy founded by Ricardo. His most popular work was his "Diary in India" (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 that country and of the character of its inhabitants.

He lived to see his measures with regard to Oude carried into effect by his successor, Sir James Outram, and to hear of the proclamation of Lord Dalhousie, and the establishment of the Rajah as governor of that district. His health gave way towards the close of 1855, and he died at sea on his return to England, February 10, 1856, a few days after having been created a Knight Commander of the Bath, at the special request of Lord Dalhousie, to mark his valuable services in the furtherance of the cause of religion and humanity by the suppression of Thuggee.

SMITH, JAMES, the great propagator of the system of deep ploughing and thorough draining, was born at Glasgow on the 3rd of January 1789. His father had been in business in Glasgow, in which he acquired some property, but died when the son was but a boy of fifteen months. The child was then placed in the charge of his mother, who was a daughter of Mr. Buchanan, of Carston in Stirling. After her husband's death Mr. Smith resided with her brother, who was the manager of an extensive cotton manufacture at Deanston, a few miles from Stirling. Mr. Smith received a classical education at home, and completed it at the University of Glasgow. On leaving the university he returned to his uncle, who had by this 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, labouring 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, promoting the labours of the labourers that were noticed with approval by Mr. Chadwick in his "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 Dalketh Farmers' Club having offered a prize of 600l. for a reaping-machine, Mr. Smith produced one, which, though it was not successful in obtaining the prize, yet proved the value of his invention, and he patented 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 Scotland. He had the management of a farm at the United Farm, and many of his experiments were eminently successful; but he could not obtain his uncle's consent to carry out a full development of his theories. In 1823 however he became possessed of the farm of Deanston, about 200 acres of extremely poor land, having a soil not averaging more than four inches in depth, formed chiefly of the debris 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 grasses in the wettest hollows and brook 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 1831 he published a pamphlet on 'Thorough Draining and Deep Ploughing,' which excited immediate attention among his more immediate neighbours, and 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 manufacturing districts, and the removal of the sewage for agricultural purposes; there were many difficulties to be overcome in effecting this, and Mr. Smith gave much attention to plans for overcoming them, proposing several means of circular 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 Committees of the counties, of which he 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 competitive trade, which he considered to be the birthright of the people of every country, was the best and most efficient form of trade. After a life of almost incessant activity, he died on the 10th of June 1850, somewhat suddenly, having retired to bed on the 9th apparently suffering nothing but an accustomary feeling of coldness. His remains were interred in the churchyard of Stirling.

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 a member of the same bar as his father, and Horace Rev. Mr. Burford, at Chigwell, in Essex, was articled to his father, and in due time 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 gratifying contributions to 'The Pic-Nic,' a periodical started by Colonel Greyville, in 1802. 'The Pic-Nic' was soon merged into 'The Bell,' and continued to appear till July, 1803, when it was discontinued. When the 'London Review' was started by Cumberland, the dramatist, on the principle of each writer affixing his name to his criticism, James Smith wrote one of the articles, but the 'London Review' also ceased to appear in 1803. James Smith 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 1813 to the 'Month,' a review in which they annually 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 was the work of his brother.

The celebrity, however, 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 stated the idea of publishing a series of imitation addresses, which idea was immediately adopted by the committee 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 the south of England, and James Smith executed his portion of the task returned to London a few 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 the work is still in circulation, it is perhaps worth while to mention the imitations of Wortworth ('Baby's Deber'), Cobbett ("Hampshire Farmer's Address"), Southey ("The Rebuilding"), Coleridge ("Playhouse Musings"), and Crabbe ("The Theatre"), are by James Smith, as well as the so-called 'Drury Lane Hysteric,' the 'Theatrical Alarm Bell' (an imitation of the editor of the 'Morning Post'), and the travesties 'Macbeth,' 'George Barnwell,' and 'The Stranger.' The rest of the imitations are by Horace Smith. The copyright, which was originally offered to Mr. Murray for 20l. was purchased by him in 1819, after the sixteenth edition, for 1000l.

Besides a great number of amusing trifles which James Smith contributed to the periodical literature of the day, he was a gratifying contributor to the earlier series of theatrical essays. In 1792 Charles Mathews displayed his extraordinary power 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 I want, good nonsense."
The brothers were both admired for their conversational powers. James Smith especially had a large circle of acquaintances, 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, 1859. In early and middle life he was distinguished for his personal beauty both of figure and face. He was never married.

Horus Smith contributed numerous pieces of poetry, half puerile, half sentimental, to the "New Monthly Magazine," while its standard editor, it is said, thought him a "very promising young poet." He was also the author of about twenty novels, of about three volumes each, the greater part of which seem to have been little known except to the regular novel-reading circles of the circulating libraries. "Gaieties and Gravities," published in 1831, was one of the earliest of his novels. "Love and Memoriam," 1845, was the latest. In the intermediate two years he gave to the public "Brambletye House," "Tor Hill," "Reuben Apsey," "Zella," "New Forest," "Walter Colyton," "Jane Lomma," The Moneyed Man," "Adam Brown," "Arthur Arundel," and others. Horace Smith died July 12, 1848, at Tunbridge Wells. He was a widower, and left two daughters.

(Memoirs, Letters, and Comic Miscellanies in Prose and Verse) by the late James Smith, Esq., one of the authors of the "Brambletye House," written by his brother, Horace Smith, Esq., 2 vols., 8vo, 1840.)

SMITH, JOHN PYE, D.D., LL.D., one of the most learned ministers and theological tutors of the Independent order. On a survey we shall make of his life, we shall find that May 29, 1774. In his early years he was employed in the shop of his father, who carried on a respectable book-selling establishment in Sheffield; but always a diligent student, and becoming strongly impressed with religious feelings, he became desirous of engaging in the ministerial vocation. He accordingly left business, and in his twenty-second year entered the Independent Academy at Rotherham. Here he devoted himself zealously to the studies of the place, and thus the character of a religious and fervent young man was formed. He went from Rotherham to a variety of places in the Wesleyan Theological Academy, Mr. Smith was chosen in 1800 to occupy the post of classical tutor in that seminary. At Heaton 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, New Haven, 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 1814 he was deprived of the position of tutor by 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. Andrews, was removed to Edinburgh, he was transferred to Highbury, and Coward Colleges. Dr. Pye Smith, who 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 5, 1861, in his seventy-seventh year. Dr. Pye Smith was held in unusual regard by all who knew him, as much for the singularly meek and humble nature of his character, 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 untiring industry, as well as of very unusual acquirements. He published numerous works on theology and on science, especially the science of geology. His great work was "The Scripture Testimony to the Messiah," 2 vols., 1815 and 1816. The remarkable range of learning which this work displayed, and particularly its familiarity with the most important subjects of science and scripture, was the attainment with 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 with disapproval by such as regarded the work with him in his general theological views, it at once took 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 ed...
book and its contents is really the point on which our esti-
mate both of the man and the doctrine must to a great extent
turn, it will be best given in his 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 endeavouring to exercise faith in the precious promises
of Scripture, I was suddenly and unexpectedly filled
with a 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 book. I opened the book; and to my amaze-
ment a passage stood before me surrounded with a glory
yet greater than that with which I was already surrounded.
The messenger proclaimed himself to be an angel of God,
sent to bring the joyful tidings, that the covenant which God
made with Abraham was to be fulfilled. I was at home,
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 Mille-
ennial reign.

I was informed also concerning the aboriginal inhab-
its of this country (America) and shown who they were,
and from whence they came;—a brief sketch of their origin,
progress, and present state of society, with all the moral
righteousness and inequality, 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 ancients, the history of the world, and the existence, birth,
and mission of 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 few
years, the morning of the 22nd of September, 1827, 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 long, and not quite as thick as a finger, and
They were filled with engravings in Egyptian characters,
and bound together as 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,'
which consisted of two transparent stones set in the rim on 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 important and interesting book 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. The second race came directly
from the city of Jerusalem, 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 in-
habitants of the country. The principal nation of the
second race flourished towards the close of the 4th cen-
tury. 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 evan-
gelists; the same ordinances, gifts, powers, and blessing was as enjoyed on the
eastern continent; that the people were cut off in con-
sequence of their transgressions; that the last of the prophets
who existed among them was commanded to write an abrid-
gement of the records that had existed on this continent. To
it he gave a name, 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.

We must here for a while interrupt the Prophet's narra-
tive. It will have been noticed that the account of his
early life, and of his proceedings between the first appear-
ance of the angel and the discovery of the plates, is remark-
ably 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 busi-
ness, but that he was of an unsettled disposition, and pro-
bably spent a good deal of time in wandering about the
pleasant countryside on the hills of Moroni, with a spade
by trying for mineral veins by a divining-rod, and some
affirm that, like Sirephel, he used "the devil's looking-
glass—a stone," and was consulted as to the discovery of
treasures, of prehistoric buildings, etc. It was commonly
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 Hale, during the interval between the first
anachronistic appearance of the angel and the efforts to
fulfil the prophecy. 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 promised 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 pub-
lication to release him from his difficulties. The work was
written in 1799; and ten years after his death, the manuscript was carried by his
wife 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 said to have been executed by
Smith, 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 inco-
herent in its details and the authenticity of the writings does not seem clear; but the book itself appears to agree
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 language of the Bible, and acquainted with the
language and scriptural allusions of his time in its
language, and using the easily-obtained in-
formation respecting the ruins of ancient "towns and
temples," which have been discovered in various parts of
America, as a ground-work for his narrative. The book
is (even now that its grosser 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
unfrequently mistaken in that respect. At the same
there is certainly nothing in the book to contradict the sup-
position that it is the work of Smith himself—for as to its
being a divine revelation, the most cursory examination of
the contents of the book is sufficient to convict it of utter
improbability of that, if its possibility were otherwise
conceivable. Be the author who he may, Smith having ob-
tained the book—whether from Solomon Spalding's tra-
bulating competent to transcribe the data, and the brain of
which the angel discovered to him—thought it behoved him
to make his treasure known. At first he told the members of his
own and his father's household, and, more fortunate
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
of the people, I believe, whenever they saw a new
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 visited the discovery was a farmer
named Martin Harris, whom he persuaded to convert his stock
into money in 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 gold
disks. Ye it was that Martin Harris, in the sight of a large
company, opened the disk to show the character, and
Anthon, who according to the triumphant declaration of
the Mormons, was unable to make out the characters, which
he described as being "reformed Egyptian"—and this is
the same as written by Morris in the "History of the auth-
enticity of the book. But Dr. Anthon's own account of
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 assurred 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). The paper consisted of all kinds of crooked 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 flourishers, Roman numerals, and thousand, were written in the margin of the columns, and in perpendicular columns, and the whole ended in a rude delineation of a circle divided into various compartments, decked with various strange marks, and evidently copied after the Mexican calendar, given by Humboldt. A translation followed in such a way as to show it was an utter fabrication. To this it is added that the people were not readily deceived."

Letter Day Saints was first organised, in the town of Manchester, Ontario county, state of New York. Some few were called and ordained by the spirit of revelation and prophecy, and began to preach as the spirit gave them utterance, and though armed and strengthened by the power of God; and many were brought to the water, being immersed in the water, and were filled with the Holy Ghost by the laying on of hands. They saw visions and prophesied, devils were cast out, and the sick healed by the laying on of hands. The work rolled on like a snowball; and 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 after Jackson county; numbers joined the church, and we were increasing rapidly, and the little bands that had been here were now spread over a large tract of country. Our farms teemed with plenty, and peace and happiness were enjoyed in our domestic circle and throughout our neighbourhood; but as we could not associate with our neighbours — who were many of them of the basest of cast — Smith had fled from the face of civilised society to the frontier country to escape the hands of justice—in their midnight revels, their Sabbath-breaking, horse-racing, they commenced at first to ridicule, then to persecute, and finally an organised mob was formed. No effort was too great to drive us out of our homes, to whip many of our brethren [Smith himself was tarred and feathered], and finally drove them from their habitations; these, housesless and homeless, contrary to law, justice, and humanity, the children till the children left their blood on the prairie. This took place in 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; many houses, widows, widowers, were left in a state of wretchedness."

No sooner was the discovery published, than great curiosity was manifested by the faithful as well as by unbelievers, to obtain a sight of the marvellous plates, and the Prophet and his mother gave a minute account of the shifts to which he was driven to obtain them. At length it was revealed to him that the desired sight should be vouchsafed to three witnesses—whose 'testimony' is prefixed to every printed copy of the 'Book of Mormon.' These witnesses aver, after more than a season's experience, that angels of God came down from Heaven, and brought into their presence, with which, as a child, they beheld and saw the plates, and the engravings thereon.

This is sufficiently vague, and it is noteworthy that the more detailed account of this transaction by the Prophet's mother, has just the same vagueness as to what manner of vision this was. But a more specific testimony was given by eight other witnesses, to whom Smith was permitted to show the plates. Mrs. Smith says that these eight men went with Joseph into a secret place 'where the family was not permitted to follow.' And he comforted them with the assurance that the plates were a guarantee of resurrection to God. They went to this place because it had been revealed to Joseph that the plates would be carried by one of the ancient Nephites. Here it was that eight witnesses saw the plates, and were shown by the angel to whom the plates were handed, to whom they were sealed.

The witnesses themselves say—"We have seen and hefted, and know of a certainty that the said Smith has got the plates of which we have spoken." Of these eight witnesses three were members of Smith's own family. After these witnesses had seen the plates, Mrs. Smith tells us, "The angel again made his appearance to Joseph; at which time Joseph delivered up the plates into the angel's hands; and Joseph himself says, 'I, the angel, delivered up the plates into the hands of Mr. Smith.'"

The angel then charged them not to speak of the matter, unless they were in danger of death. The witnesses were not required to speak of the matter to any one; and if they were asked, they were to say that they had only seen the plates, and that they were not qualified to give any account of them."

An admirable site having been purchased by them on the Mississippi, at the head of the Des Moines Rapids, they "in the fall of 1839" laid the foundation of their famous city of Nauvoo, or the Beautiful, for which the state legislature granted them in December 1840 a charter of incorporation with unusual 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 "1500 well-built houses, with all the facilities for living had by him for temporal as well as spiritual guidance. Among the chief things which he describes as provided for, was "the University of Nauvoo, where all the arts and sciences will grow with the growth, and strengthened with the strength of this beloved city of the saints of the last days." The greatest feature of the city was 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 180 feet by 90 feet, of stone with polished pilasters, of an entire round form, on a plan consisting of a double temple 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."
various kinds bestrid 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 free after the death of the 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 distance" from the scene of the sedition. Among his followers too there were occasional symptoms of disaffection, 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 a result, the great majority of the Mormons were being expelled from the city. Smith himself felt this expulsion 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 arms in secret, as is affirmed, from among Smith's declared enemies; 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 event 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, who was elected, took measures 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 any real opportunity be obtained for the realisation of the only stipulation made with his enemies was that they should be unmolested till they could finish and dedicate their beautiful temple; and as soon as that was accomplished, September 1846, 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 yet the whole of 1844 and 1845 were marked by the diffusion of his disciples, but that their number was very great, and that they were 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 [Uran., S. 3]. 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 the use of his church. Thus, he wrote:

"We believe in God the Eternal Father, and his Son Jesus Christ, and in the Holy Ghost."

"We believe that men will be punished for their own sins, and transgressions;"

"We believe that through the atonement of Christ all men may be saved, by obedience to the laws and ordinances of the Gospel."

"We believe that those ordinances are—1st, Faith in the Lord Jesus Christ; 2nd, Repentance; 3rd, Baptism by immersion for the remission of sins; 4th, Laying on of hands for the gift of the Holy Spirit."

"We believe that a man must be called of God by prophecy, and by laying on of hands by those who are in authority, to preach the Gospel and administer the ordinances thereof."

"We believe in the same organisation that existed in the primitive church, namely, apostles, prophets, pastors, teachers, evangelists."

"We believe in the gift of tongues, prophecy, revelation, visions, healing, interpretation of tongues, &c."

"We believe the Bible to be the Word of God, so far as it is translated correctly; we also believe the Book of Mormon to be the Word of God."

"We believe all that God has revealed, all that he does now reveal; and we believe that he will yet reveal many great and important things pertaining to the kingdom of God."

"We believe in the literal gathering of Israel, and in the restoration of the Ten Tribes; that Zion will be established upon this (the Western) continent. That Christ will reign personally upon the earth; and that the earth will be renewed and receive its paradioc glory."

"We claim the privileges of worshipping Almighty God
according to the dictates of our conscience, unmolested, and allow all men the same privilege, let them worship how, where, or what they may.

We believe in being subject to kings, presidents, rulers, and magistrates; in obeying, honouring, and sustaining the law.

"We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men: indeed we may say this of all things. But as he was engaged in very various and different 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, we seek them all.

In this creed 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 last year of Smith's life, this was one of 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 revelation to the initiated. He is said however to have "sealed" to himself "plural wives," as the Mormons express it, to 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 "developmenta of the Smithites.

SMITH, ADMIRAL SIR SIRNEY, was born at Westminister 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 1793, he was made captain of the South East. In Sweden, he obtained permission to offer himself as a volunteer to the latter power, in whose service he showed so much courage and skill as to lead to his investment with the order of the Lion. On the surrender of Toulon to Lord Hood, August 1793, Captain Smith commanded 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, the capture of the lectores, and the taking of the magazines, arsenal, and stores, was entrusted to 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 Havre he was made prisoner.

After a confinement of over two years, Captain Smith, by the assistance of a French officer named Philippeaux, made his escape and reached England in safety. Appointed to the command of 74 guns, and in 1798 Sir Sidney 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 advantage adapted for the purpose intended, namely, that of exciting the student, rather than as satisfying all the requirements of the student; nevertheless they contain a useful commentary on the events: the first two series, though the briefest, being perhaps the best. In 1860 was also printed, for private circulation, what is called an 'Occasional Lecture.' It is a pleasant little pamphlet, occasioned by the desire of a lady to hear a lecture, of which it takes the form. It is an eloquent on woman, displaying considerable originality of thought and diction, and is dated 1814. In 1845 he published his last work, 'Evidences of Christianit,' and on June 24th, 1849, he died at Norwich, after having worthily occupied his professorial chair for forty years. In 1851 a painted window by Warrington, representing the 'Adoration of the Magi,' was erected by some of his friends to his memory in the north aisle of Norwich Cathedral.

SNAKE-FISH. [Coryph.]

SNEET-FISH. [M. Coryph.]

SNOW-BERRY. [Coryne. S. 2]

SNOW-BUNTING. [Emberiza. S. 2]

SNOWDROP. [Galanthus.]

SOBA-AJUM. [M. Mysalop.] 

SOLAN. [Solan.] 

SOLASTERIE, or SOLASTERIRE. [Solan.] 

SOLASTREIRE, or SOLASTERINE, a sub-family or "Asteridae, including those forms of Star-Fishes which have two ranks of suckers in each avenue. There are two British genera, "Ordalia and "Solaster."

Ordalia has only a few rays covered with spines-bearing

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wars; the intermediate spases 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. rosea.

Solaster (Forbes) has many rays studded over with bunches of spines; the avenues bordered by three sets of spines.

S. popea, the Rosy Sun-Star, is common on the eastern coasts of Great Britain, where, on account of its numerous rays, it is called Two-Fingers. It is a deep red or orange-red color. On the British Islands, S. rosea.

SOLDANELLA, a genus of plants belonging to the natural order Primulaceae. Some of the species are slightly purgative.

SOLDAILL [WARWICKSHIRE].

SOLITARY BIRD. [Dodo.]

SOLOMON'S SEAL, the common name of the species of Polygonatum, a genus of Plants belonging to the natural order Liliaceae, and the sub-order Asparagaceae.

Polygonatum has the perianth tubular, 6-toothed, tardily deciduous; the ovary 3-celled: cells 3-ovulate; the stigma blunt, trigonous; berry with 1-seeded cells; the flowers not jointed to pedicel. There are three British species.

S. verticillatum has linear-lanceolate whorled leaves, with an erect angular stem. It is a rare plant in Great Britain.

P. officinarum. Solomon's Seal, has leaves ovate-oblong, half-capping, glabrous, stem angular: peduncles 1-3-flowered; filaments glabrous. It is the Consolarius Polygonarum of Linnaeus, and is confirmed with the following. It is only found in Scotland.

P. multiflorum has leaves ovate-oblong, half-capping, glabrous, alternate; stem round; peduncles one or many-flowered; filaments downy. This plant is the common species of the sub-order Asparagaceae.

SOMERVILLE. [MINERALOGY, S. I.]

SOMMITE. [NAPPELINE.]

SOPHIA, a city in Bulgaria in European Turkey, situated on the route from Constantinople to Belgrade, about midway between Nissa and Philippopolis, near the point indicated by 43° 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-stocking, for which the city is celebrated, bottled beer, henna, leather, and tobacco. Sophia was formerly the residence of a pasha and capital of an eyalet of the same name, but the eyalet is now named from its capital, Nissa, called by the Turks, Sis, which was elevated to a Grand archbishop and to a Catholic bishop. There are hot-springs in the environs. Sophia is a place of considerable commerce. It was founded by the emperor Justinian on the site of the ancient Sardico. The only remains of antiquity are the ruins of the church founded by Justinian. Sardico is famous for the council held in it a.d. 347, which confirmed the decree of the Pope acquitting St. Athanasius of the charges brought against him at the council of Antioch. The council of Sardico also passed twenty-two canons, one of which enacts a bishop condemned by a provincial council to appeal to the Pope, is a consecrated bishop, to the number of about eighty, withdrew from the council of Sardico to the town of Philippopolis, and held what they called the council of Sardico, in which they pronounced sentences of excommunication against Onis, St. Athanasius, and the Pope. (Frontier Lands of the Christian and Turk; L'Art de Visiter les Datas.)

SORDAWALITE. [MINERALOGY, S. I.]

SORD, [Craw.] (1602-1667).

SORREL, WOOD [OCCALES.]

SOULIE, MELCHIOR-FRÉDÉRIC, one of the most fertile writers of the French Romantic school, was the son of a teacher of philosophy at Toulouse, and was born at Foix, in the department of Ariege, December 22, 1800. In 1829 he wrote his father having obtained employment at Nantes, Frédéric Soulé commenced his studies at the Lycée of that city; and afterwards completed them at Poitiers, Paris, and Reuens, so migratory was his early life. In 1828 he accompanied his father to Laval, where the elder Soulé had received an appointment in a public office, and in this office the future novelist laboured also assiduously for several years. The object of his father had been to prepare him for the bar, and young Soulé having spent several years in the study of law, avocacy, and waited for his briefs like other barristers. But his inclinations were for literature; he wrote pretty verses for his amusement, his letters already displayed an elegant style, and a vein of exquisite pathos, if not of the highest perfection, pervaded all his productions. In 1825 his father's dissolutive life brought the family once more to Paris; when the young poet published a volume of fugitive pieces under the title of 'Amours Francaises.' The book did not sell; but several of the poems it contained have since sold many thousand copies. From that time forth he was a man of letters, and his work was produced at the Odéon his 'Christine à Fontainebleau,' but it failed; and in 1830 he began to write critical articles for the Mercure, the Figaro, and the Voleur, in all of which his genial spirit sought consolation for his own failure, by his career and continued for twenty years, 1830-49, in which period the work was produced at the Théâtre Français in 1831 with better success, was followed in 1833 by his Cloître, the triumph of which, both on the stage and in the drawing-room, was about completed.

Shortly after his Cloître, which established his reputation as a dramatic writer, Frédéric Soulé began to contribute a series of romances in the shape of feuilletons to the newspapers. In this new and lucrative class of literature, he became and continued for twenty years, 1830-49, in which period the work was produced at the Théâtre Français in 1831 with better success, was followed in 1833 by his Cloître, the triumph of which, both on the stage and in the drawing-room, was about completed.

In 1834 he was in Paris. During the period of the July Monarchy, he was a writer for one of the popular French romancers. The Deux Cadavres" was published in this form in 1833; the Vicomte de Beziers in 1834; the Comte de Toulouse in 1835; the Comte de Foix in 1836; 'Un Évêque à Rome' and 'Deux Sœurs' in 1837; 'L'Homme de Lettres,' in 1838. In this manner upwards of thirty fictions, some of them of considerable length, were produced. In 1842 appeared his Mémoires du Diable, the sale of which was immense. It was a commentary on the work of Eugène Sue, and was undertaken by Eugène Sue to undertake his Mystères de Paris. Soon after the success of Sue and Dumas in the same class of writing somewhat obscured the fame of Frédéric Soulé, who witnessed their sudden popularity without jealousy, although he was a little vexed at the preference accorded to those whose proprietors to the last paid him liberally for his work. In 1846 he brought an estate at Blavre, where he died September 22, 1847.
led the attack of the left at the battle of Weissenberg, and repulsed a body of Austrians. His next service was in the Palatinate under General Lefebvre, who entrusted him with the command of a division of light infantry. In 1794 Soult was created colonel, and was one of the most distinguished officers present at the great battle of Fleurus, June 26. He displayed great skill by his dispositions in this action, and in the action of the 21st. At the battle of Fleurus, he was vaccinated, but he was not entirely defeated. Shortly after this victory, being detached with 500 horse to cover the left of the army at Herborn, he was suddenly hemmed in by the enemy's cavalry, amounting, it is said, to 2000 horse, this being the general régime; conduct which was not forgotten in after days.

In 1799 he joined the army of the Upper Rhine, under Jourdan, and at the head of the vanguard of the left wing was present at the battle of Stockach, March 25. Though the battle was eventually won, after a fierce struggle, by the Archduke Charles and the Austrians, such was the opinion entertained of Soult's skilful conduct, that the Directory promoted him to a division on April 31st, while Jourdan, the commander-in-chief, lost credit and command by the same action. Soon after, he found himself under the orders of Massena, who, besides his own army in the Alps, had lately succeeded to the command of that on the Rhine, after Jourdan's disgrace. Under Massena, he was appointed to the post of chief of staff. On April 30th, June 4, 1799, when the Austrians were defeated, and France preserved from invasion. In 1800, when Massena shut himself up in the walls of Genoa, General Soult was one of the most active of its defenders during the siege, distinguishing himself highly in the numerous skirmishes which took place beneath its walls. He was wounded and taken prisoner in one of these sorties, but recovered his liberty after Napoleon's victory of Marengo.

On the 14th of June, 1800, the military command of Piedmont was conferred upon General Soult; who was next despatched with a corps of 15,000 men to occupy the peninsula of Otrante; but after the peace of Amiens, he was superseded in this government by General Montholon. Soult was then placed in the Dalmatian front during the lapse of hostilities, and though, for some unexplained cause, he was not personally a favourite with Bonaparte, on the recommendation of Massena he was one of the four colonels of the Consular Guard. The rupture between England and France soon followed, and it was General Soult who organised the vast armament collected on the heights of Boulogne, known as the Army of England. Meanwhile, the French Empire had been formed, and so astounding had been the events paid by Soult to the First Consul during the short period of transition, that although he had served neither in the first campaigns in Italy, 1796-97, nor in that of Egypt, 1798-99, nor even yet fought under Napoleon, nor commanded an army in the field, his name was included in the list of French marshals created at the coronation.

In the campaign of 1805 Marshal Soult obtained still greater distinction; his services at the battle of Austerlitz, December 2, being so efficient, that Napoleon thanked him on the battle-ground, before his马, during one of the first of living strategists. Thereupon, and after the end of the war, he ranked as one of the leading generals of France, to whom the greatest undertakings might be committed with confidence. In 1805, when France was assured of success, he took part in the campaigns of 1806 and 1807. After the battle of Jena, October 14, 1806, he defeated Marshal Kalkreuth, captured Magdeburg, and put to flight the Prussian General Blücher, and the Russian General Lestocq. Before Copenhagen, when the long-continued war of taking the place. Soon after this check, King Joseph returned to Madrid, leaving the marshals in command of the Army of the South, consisting of the 1st, 4th, and 5th corps. The year 1810 was almost entirely occupied by the marshals in establishing a settlement in Andalusia; but the wide contortions over which his troops were disper-
exposed them to loss in petty skirmishes with the enemy, who, supported by the strong fortress of Badajos 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 besiege Badajos, but he had the place on the 11th of March, 1811, the Prince of Essling, unable to penetrate the strong lines of Torres Vedras, found it necessary to abandon Portugal.

The departure of a British army, having relieved the English army from one of their most formidable opponents, Lord Wellington determined to recapture Badajos, 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, although at first it seemed that he could oustrip his opponent in a race of success,—through means of his greater superiority in numbers he inflicted great loss upon Beresford's army—he was thoroughly defeated. The fall of Badajos now appeared inevitable, and, the departure of a British army, the most septet, ordered Marshal Marmont, who had succeeded 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 Badajos, and—though not without terrible loss—the place was carried on the 6th of April, 1812. Soult was in consequence compelled to retreat from Beville, his retreat being several marches long. The consequent 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 before the allies. A number of Soult's detachments retreated and ordered to join him. Accordingly, to his deep regret, he marched out of Andalusia, and on the 10th of November took the command of the three combined French armies stationed on the Tormes. This junction of forces was too powerful to be attacked; Lord Wellington therefore fall 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, Soult found himself involved in a great struggle against Marshal Soult for the great extortions 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 Peninsular 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 campaign; and in May of that year he was laid down from the command of his guard, after the death of Marshal Bessieres at Weissenfels.

But the disastrous defeat of Marshal Jourdan at Vitoria, on the 21st of June, 1813, having thrown off all fear of loss of Spain, after an occupation of five years, but the security of the French soil, Napoleon was once more compelled to employ Soult in the Peninsula, though it was not without some sense of shame that he sent him there. Accordingly, in July, Soult returned to Spain as commander-in-chief of the French armies. Then followed the most arduous period in his career; and although—overmatched by the genius of Wellington—nearly every enterprise was a failure, and every battle was a check, the French never despaired. The fall of Pamplona, the battles of San Marcial and Sorauen, succeeded, in all of which the marsh was worsted; then he took up a strong position on the banks of the Bidasoa, but was driven from it by the leader before whom so many marshals had succumbed. The losses of Napoleon in Champagne required some relief, and thousands of Soult's veterans were drafted off; his German troops deserted him. Still, with the resources at his hand, and placing, had enabled him to defend himself the marshal formed a strong position on the Nive. He was driven from this river, he took up a strong position on the Nive, whence his impetuous enemy dislodged him; but, without being depressed, he offered the English army a bloody battle, and with the loss of 8,000 men. Wellington had at last entered the French territory in the south, whilst in the north Napoleon was falling back before the allied armies. But even then he did not despair. A trace of a few weeks was forced upon the opposing armies after November, when both sought winter quarters. But early in February 1814 the war was renewed. The battle on the Adour, the battle of Orthes, the battle of Tordes, succeeded each other, and were lost by the marshal. To complete his bankruptcy, he had been defeated by him in the battle of Bordeaux against the Bourbons, and the subsequent capitulation of Paris. Yet, even when the three allied armies were in possession of the capital, when Lyon had submitted, when so many marshals and generals were deserting Napoleon at Fontainebleau, he fall back upon Touloude, and there, in an admirable position which not even the impetuous valour of British troops could force without a carnage so fearful as almost to balance their own victory. The loss of the French was however more than commensurate, and the adven- new for the second time, in September 1814, he wrote to the king requesting leave to resign. His request was granted; but in order to mark his appreciation of the serv- tures of the marshal, Louis-Philippe re-established in his government, and, without his title, that of Marshal of France, which had not been borne by any subject since the death of Marshall 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 long been shaken; the marshal grew worse during the year 1851, and breathed his last at the castle of Soult-Berg, on the 26th of November in that year. After his death his splendid gallery of Spanish pictures collected by him during his Spanish campaigns was sold by his son, and the proceeds of the sale were placed in a trust fund. The best of these pictures are now in the Imperial Galleries of France. The "Mémoires du Maréchal General Soult, duc de Dalmatie, publié par son fils. 1ère partie. Histoire des guerres de la conquête de l'Italie," appeared in three vols. 8vo, with an Atlas, Paris, 1864.

SOUTH AUSTRALIA. Under this head, in Supplement 1, an account of the geographical features of the colony was given. It has risen since into 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 pure and elastic, and favorable for 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 infeduza; and at particular seasons there are some cases 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 con-}

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metal, in the form of a pure oxide requiring no flux to smelt it, the heat of a blacksmith's forge suffice to run the metal. The lode is 17 feet wide, of great extent, and is quarried by open stone pits. The output in 1856 was 20,000 tons of copper ore, valued at 360 per ton. The lead-mines are Glen Osmond and Wheatley mines, about six miles south from Adelaide, and the Wheat Gawler and Yatalainga mines, the first two yielding 76 per cent of metallic.

The native races 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 civilisation and refinement. Two or more distinct races, each of which has been adopted for their improvement with some degree 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 Hall, in which the youths 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 among the restless Aborigines who live in the wilderness and 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, three of which were unintelligible to natives from the neighbourhood of Lakes Murchison and Moonta. The other parts of the colony are generally peaceful and inoffensive.

The settled parts of the colony have been distributed into the counties of Fleurieu, Barra, Stanley, Gawler, Light, Eyre, Adelaide, Sturt, Hindmarsh, Grey, Robe, Russell, all lying to the eastward of the gulfs of Spencer and St. Vincent; and the county of Flinders on the south-west shore 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 salt is produced from the sea water shipped for Swansea. Roads and bridges have been liberally provided for as settlements have been formed.

The population of South Australia in 1858 was 97,887. 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 1856, in terms of all previous parliaments, consists of 36 members, 12 of whom are nominated by the crown, and 16 are elected by 10l. 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 representation. The members of the executive council, and of the legislative council, and the persons on the jury list, form the body of voters for the purposes of the franchise. The executive council meets when summoned by the governor, and not less than once in three months, and the legislative council when convened by the governor, or at the request of 10l. householders in any district, and not less than once in three months. The salaries of the executive council is 100L. sterling per annum, and the legislative council 100L. sterling per annum.

For the promotion 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 40l. per annum. The following are the returns for the year 1856: The number of imparished children in January 1856, was 69, with about 3300 scholars. The amount paid to teachers during the year was about 3100L.

In 1858 there were about 180 places of worship in the colony. The ministers of religion are of all the churches of England, under the superintendence of the Bishop of Aden.
SOUTH MOLTON. [DEVONSHIRE.]

SOUTHERNWOOD. [HEREFORDSHIRE.]

SOUTHEY, CAROLINE ANNÉ. (better known as Caroline Bowles), the second wife of Robert Southey, was the only child of Captain Charles Bowles, of Buckland, near Lymington, Hampshire, where she was born December 6, 1787, and where she spent the whole of her days, with the exception of a few months in 1808, when she went to London. Miss Bowles was described by her brother as a woman of great learning and refinement, who was the object of the esteem of all who knew her. Her name was known, and her friendship eagerly sought after. Miss Bowles first appeared before the public as an author in 1820, when her poem 'Ellen Fitz-Arthur' was published, but without her name. Indeed it was not till many years later that any of her works were issued under her name, though their authorship was no secret in literary circles. In 1822 she published 'The Widow's Tale, and other Poems'; in 1836 'Solitary Hours' (prose and poetry); and in 1839, in two volumes, 'Sketches on Churchyards', which had already appeared in 'Blackwood's Magazine', where they had excited much interest. In June 1839, as already mentioned, Miss Bowles was married at Bedle Church, in the New Forest, to Robert Southey. Some time after their marriage, Miss Bowles, although the eldest child of the house, was allowed to exercise her literary talents. In 1841 she published a sonnet to the memory of her father, and in 1842 she wrote a poem on the death of her mother. In 1843 she published a poem on Robin Hood, commended by Southey, which she published in 1847, and afterwards in collecting

to the prevailing winds; but the great expense and delay in the transport of merchandise between the city and the port was much lessened, and the number of vessels which called on which vessels of 1000 tons burden can be raised, a wet dock, a church, a Presbyterian chapel, a theatre, and numerous shops.

The population of Adelaide, Port Adelaide, and Albert Town, is about 15,000, and consists of persons of all ages and all classes. The soil is rich and fertile, and the climate is healthy and invigorating. The town is well supplied with water, and has a good system of streets and squares. The architecture is neat and substantial, and the houses are built of stone, brick, or wood, and are well adapted to the climate. The streets are broad and regular, and the squares are large and spacious. The town is well lighted and ventilated, and the air is pure and invigorating. The town is well supplied with water, and has a good system of streets and squares. The architecture is neat and substantial, and the houses are built of stone, brick, or wood, and are well adapted to the climate. The streets are broad and regular, and the squares are large and spacious. The town is well lighted and ventilated, and the air is pure and invigorating. The town is well supplied with water, and has a good system of streets and squares. The architecture is neat and substantial, and the houses are built of stone, brick, or wood, and are well adapted to the climate. The streets are broad and regular, and the squares are large and spacious. The town is well lighted and ventilated, and the air is pure and invigorating.
her husband's letters, which have since been edited by Mr. Wartier. The poetry of Caroline Bowles is of a kind that will always give pleasure to persons of a reflective turn of mind, and much is truly beautiful. It is tender, graceful, and, though somewhat melancholy, pervaded by a fine moral tone; but it is diffuse, and wanting in strength of thought and passion.

Every successful writer was living on a new vacation, and had begun to diffuse new and more rational ideas among 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 5th 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 1768, and died on the 50th of July 1854. He studied natural history with more success than his older 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 in 1820. In 1824 his father and brother executed the drawings and engravings, and he drew up 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 Sturckland's 'Bibliography of Zoology,' published by the Ray Society. Besides these papers, he executed work on the genera of shells which he published several other important works; and amongst these should be mentioned the Catalogue of the collection of the late Earl of Tankerville, 'Species Conchylorium, or concise original Descriptions and Observations of all the Species of recent Shells with their Varieties,' London, 1830. 'Conchological Illustrations, or coloured figures of all the hitherto unfigured recent Shells, with their Varieties,' London, 1832-45. 'Thesaurus Conchylorium, or Figures and Descriptions of Conchylorium,' London, 1842. He was a Fellow of the Linnean Society.

SOWERBY, CHARLES EDWARD, third son of James Sowerby, was born on Feb. 1st, 1785, and died in June 1848. He assisted first his father and afterwards his brother James de Carle in their natural history publications. In 1821, when the copyright of 'English Botany' falling to his share, 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.

SPAIN. Since our previous account very material alterations have taken place, which we shall briefly indicate. The first is the subdivision 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.

#### Old Provinces.

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<tr>
<th>Province</th>
<th>Area in Si. Miles</th>
<th>Population</th>
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</thead>
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<tr>
<td>Asturias</td>
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</tr>
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<tr>
<td>Huntingdon</td>
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#### Modern Provinces.

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SOU 649 SPA
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<tr>
<th>Old Provinces</th>
<th>Modern Provinces</th>
<th>Area in Sq. Miles</th>
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**Commerce and Manufactures.**—Spain, from the extent of its coast-line, its large ports of Cadiz, Cartagena, and Ferrol, the number of its smaller harbours, 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 cottons, linens, muslins, thread, stockings, and the like, and tobacco to a large amount. The total import into Spain during the year 1869 amounted to 867,171,795 reals (about 6,160,000l.). Of these course are the registered imports. The amount of goods smuggled into the country cannot be estimated. The value of the goods smuggled during the same year amounted to about 6,000,000l. The imports consist of wool, wine, brandy, oil, fruits, chestnuts and nuts, cork, quicksilver, indigo, with a lead, and salt, with a small quantity 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 porcelain, but they are all in a decayed state except the manufacture of Seville. Other manufactures are silks, coarse cottons and woollens, and leather. Cutlery and iron-ware are made to some amount in the Basque Provinces and Asturias. 

**Roads, Canals, and Railroads.**—The public roads in Spain, except those that reach the capital, are not very well made. The railway lines completed in January 1858, are— from Barcelona to Arens del Mar, 23 miles; from Barcelona to Granollers, 19 miles; from Barcelona to Martorell, about 20 miles; from Barcelona to Tarrasa, 22 miles; from Valencia to Albacete, 173 miles; Reina to Alar de Rey, 32 miles.

**Revenue.—**The budget proposed for 1857 amounted to 20,030,000l.; the ordinary receipts were estimated at 14,400,000l., leaving a deficiency to be supplied of 5,630,000l. The amount of the public debt in November 1856 was 141,200,000l., on which the interest payable was 2,277,000l., in addition to a loan of 8,330,000l. recently contracted for. The army and navy are under Military and Naval Forces, S. S. 1,400,000l.

**Religion and Education.**—The established religion is the Roman Catholic, and no other is allowed in the Spanish dominions. The crown presents the archbishop and bishops, whose titles are confirmed by the Pope. The clergy was at one time immense. After the revolution of 1818, the monastic orders were suppressed, and the convents and the lands belonging to them were sold; but the convents of nunns were suffered to remain till the death of the then occupants. A law was passed in 1856 for the sale of the whole of the church-property, and its conversion to secular uses; which law was revoked, at least so far as the property unsold, in 1877; and an indemnity to the clergy of upwards of 2,500,000l. has been introduced 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 educated at home, in France and other countries. The universities, formerly numerous 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 academies and literary societies in Madrid, Cadiz, Seville, 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 for the succession was declared null and void by the 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 1856 the government of the province of Barcelona was brought under the measures of the Spanish government, interdictory measures been introduced in Barcelona and other places. On the 22nd
of February the whole kingdom was declared in a state of siege. On the 16th of July the city and garrison of Narvaez were invested by the number, from independence (or declamation) against the government. This was followed, July 17, by an insurrection in Madrid. The streets were barricaded, and the people fought against the soldiers till July 19, when the rebels gave up the contest, and a National Junta was established.Eventually the constitutional government was re-established; and the queen-mother was banished from the kingdom, August 28, 1834. In June, 1836, a revolution took place, and General Benavides was reinstated in power. 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 haphazard on the surface of the earth; or, 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 will have lain in soil that is too tenacious or too loose, too dry 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 that not light will be held by those 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. Tem- perature is the same. If there is a cold climate the same plants are smaller and weaker than ordinary, the colour of the flowers and fruit is paler, the wood worse ripened, their leaves more deciduous, their flowers of a more abundant perfume, &c.; it is often desired to nourish it throwing itself into the neighbour of a warmer heat and light. In a hot climate plants become larger, produce more wood, and their leaves have brighter colours and a higher flavour. In the same climate humidity causes the same effect with the plant, its flowers and fruits becoming larger, its leaves more numerous; plants that grow in water lose all their hairs, their leaves become divided into capillary segments so as to look like hairy roots, their stems and flower-stalks lengths 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 Rannunculus 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 smaller, its leaves become less numerous, its flowers and acquires greater hardness. In air rarified like that of mountains, plants are generally found smaller and more stunted than usual, while their flowers are larger than upon the plains. The influence of soil is not less manifest: if it is tenacious, the roots, which are indurated with it, grow slowly, small, hard, and clustered; if it is very sandy, the roots become large, flabby, and fully formed; if it contains a great quantity of carbon, the colours of the flower are often altered, as those of the Hydrangea into blue, and of the Pink into violet; if it is charged with salt, or if the plant is within the reach of salt, even brought through the atmosphere, we usually find the leaves more flabby and more glaucous, as in Eucalyptus. All these different circumstances, combined with each other in nature, are fertile causes of varieties, which are still further multiplied by cultivation.

SPREADWELL. [Vronidra.] SPHENOPS. [Scincopinae.] SPHINCTILITE. [Minerals, S. 5.] SPIDERS. [Arachnida, Araneida, S. 2.] SPONTINI, GASPARD; a celebrated Italian dramatic composer, was born at Jesi, in the Roman States, in the year 1776. After studying the principles of music under Padre Martini at Bologna, he entered, at the age of thirteen, the conservatory of St. Cecilia, and was received with great renown. At seventeen he composed his first opera, 'I Puntigoli delle Donna,' which spread his name over Italy, and led to the favourable reception of a long series of dramas, one of which, the 'Paride,' as soon as it came under the management of the French opera; 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

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2 6 5

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1 4

5 5

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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 in Berlin, and died at the Prussian capital, and held this office at the time of his death, January 21, 1851.

SPURGE LAUREL. [Daphne].
STAG-BEETLES. [Lucanidae.].
STAINBRIDGE. [P.].

STALYBRIDGE, Lancashire, a market-town in the parish of Ashton-under-Lyne, is situated chiefly on the river Tame, in 53° 30' N. lat., 2° 4' W. long., distant 8 miles from Manchester and 81 miles from London, by N. from London by road, and 198 miles by the London and North-Western railway via Trent Valley. The population of the town in 1851 was 20,760. 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 corn-mills. The parochial chapel is an octagonal structure occupying an elevated site, and there are three district churches, chapels for Wesleyan, Primitive, New Connexion and Association Methodists, and for Independents, Baptists, and Roman Catholics; National, British, and Roman Catholic Schools, and Sunday schools, in operation. Saturday is the market-day; fairs are held on Easter Monday and November 5th.


STAMP DUTIES. That the relaxing of a heavy tax, while it conveys great advantages to 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 other cases, 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 the post office and to the public, is the point to 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 stamp produced by the Stamp Duties was £5,667,648.
In the year ending March 31, 1855, £7,532,239.

It must, however, be taken into account that the Succession Duties were then first passed. But in 1852 the stamp duties amounted to 6,761,634l.; and the penny receipt duty has come into operation since.

In pointing out the difference between the former and the new duties, the ad valorum duties first claim attention.

Corporation Duties upon the Act of Property. — These duties show a considerable reduction in all purchases for sums not exceeding 200,000l. The highest ad valorum duty under the late law was 100%, but being no increase on sums not exceeding 100,000l.; 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 500l. to 100,000l. That duty was not a uniform percentage, as at present, but a fixed amount on all sums between those specified in the scale, being somewhat more or less than 17% 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 £20 or over £100, for the most part, much higher, being as much as 41% per cent. on the mean sum under £20; 35% on that under £50, and 17% over £150. On purchases of small properties, therefore, the advantage is very great; and, referring to these, the justice and propriety of the new scale of duties will be more apparent. In giving a comparative advantage 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 "over £20," and "below £100," and not substituted for "amounting to" and "not amounting to." The omission to charge the ad valorum duty on conveyances where the consideration was stock, whether in the funds, or of any company, is supplied.

The following copies of a table will exhibit at a glance the difference between the old and the new duties in all cases of sales for sums not exceeding 1000l.

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<th>50 and not exceeding</th>
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<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>500</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>600</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>700</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>800</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>900</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>1000</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Bonds and Mortgages. — These duties are also charged at one uniform rate throughout, viz., 2½d. for every 100l., and any portion of 100l., except that on sums not exceeding 300l. the duty is imposed by fities, so as to charge only 13d. on the fraction over 50l.; thus favouring minor transactions, instead of the more important ones and the old system. The regulations are, however, well adjusted and wholly indefensible upon principle; as will be perceived when it is stated that the duty on the mean sums in the scale, from not exceeding 60l. to not exceeding 20,000l., gradually diminished from 4½ per cent. to 2½ per cent.; the highest duty being 5½l., the lowest 0.001l. on 40,000l. was 1½d. 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 20,000l.:

<table>
<thead>
<tr>
<th>Amounting to</th>
<th>50 and not exceeding</th>
<th>50 and not exceeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>200</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>300</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>400</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>500</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>600</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>700</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>800</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>900</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>1000</td>
<td>3</td>
<td>3</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>Amounting to</th>
<th>50 and not exceeding</th>
<th>50 and not exceeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>200</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>300</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>400</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>500</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>600</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>700</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>800</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>900</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>1000</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

At this point the old duties stopped, there being no increase beyond 2½l. whatever might have been the amount of money secured; but the new duties continue on, ad infinitum, at the rate of 1½d. per cent. for every additional 100l., and in proportion for less than 1000l. 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 thereon extends to cover. In other such cases of bonds the 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 valorum duty on the money advanced. The case of an advance under the Private Drainage Act (12 & 13 Vict. c. 100) is referred to in the work of a writer on the stamp laws (supplement to Tilsley's Treatise on the Stamp Laws, p. 26) as an instance in which this will apply.
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 transfer of mortgage is now only ad valorem on the bond 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 money duty as would be payable on a bond given for securing money to the same amount 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 otherwise be payable. The refunds under the new Act, however, take away the advantage of the former principle. The repealed duties on leases, computed on the mean sums in the scale, were as follows, viz. 10l. per cent. on rents under 20l.; 5l. per cent. on rents under 100l.; 3l. 6s. 8d. on rents under 200l.; and gradually decreasing to 1l. 6s. 3d. for rents under 2000l. or upwards being 1l. 10s. 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 advantageous to the owners and occupiers of property in large towns.

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 corn, 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, of, in Scotland, the faro prices of the county.

Assignments and surrenders of leases not upon sale or mortgage are to be paid 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 amount upwards of 200l. whereas, under the new Act, the maximum amounting to 20,000l. or upwards being 7s. per cent. on the mean sums under 1000l., and averaging less than 2s. 6d. on the mean sums above 1000l., and under 20,000l. Thus the order of duties is the same.

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 afford 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 law, purely or upon account of its weight, owing to doubts previously existing, to be an important duty, of the amount not considered to have been intended by the legislature. The shifting of a mortgage security from one to another is always a cause of vexation to the debtor; 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 only 1s. 6d. of which the 1s. 15s. 4d. was the ad valorem duty of mortgage was 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; and it is thus a duty which, on a mortgage on a lease for a year, of which hereafter, where that attached) upon every transfer of mortgage, whether the money secured was under 100l. or above 20,000l. This is now remitted. 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 reduced to 1l. 15s. This mortgage is relieved from one stamp of 1l. 15s.; and on all transfers where the money secured does not exceed 1400l. further proportionate relief is given. Where, on a transfer, the money secured is more than 1400l. duty is payable on such further advance. It was payable in lieu of one stamp of 1l. 15s.; now, in such a case, the new ad valorem duty is all that is chargeable.

Further Assurance and further Security.—These instruments, which have been charged with ad valorem duty, 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 machinery of the former system was revolutionising the former principle. The repealed duties on leases, computed on the mean sums in the scale, were as follows, viz. 10l. per cent. on rents under 20l.; 5l. per cent. on rents under 100l.; 1l. 6s. 8d. on rents under 200l.; and gradually decreasing to 1l. 6s. 3d. for rents under 2000l. or upwards being 1l. 10s. 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 advantageous to the owners and occupiers of property in large towns.

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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 afford almost uniform relief.

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property the instruments charged with ad valorem duty are, of course, liable to tax under the new duty. In some instances the instrument was not subject to ad valorem duty. In the case of an ad
mitiance the instrument was charged with 1\(\frac{1}{4}\), or, where the yearly value did not exceed 1\(\times\), with 5\(\times\). By the new Act these duties are reduced to 2\(\frac{1}{2}\) and 6\(\frac{1}{2}\), whereas the 1\(\frac{1}{4}\) and 5\(\times\) were payable on a sale or mortgage. In all other cases the duty on an admissiace 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 where the ad valorem duty bond duty was considerable, a practice might be resorted to of executing a covenant, as a security, which would be liable only as a common deed to 1\(\frac{1}{4}\), in lieu of giving a bond; it was therefore thought proper to impose an ad valorem duty on a deed of covenant, which duty it exceeded 1\(\frac{1}{2}\), 1\(\frac{1}{2}\). 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 10\(\frac{1}{2}\); or less, where the duty on the conveyance is less.

Agreement.—The duty of 2\(\frac{1}{2}\), 6\(\frac{1}{2}\), on an ordinary agreement remains as before, except that this amount is sufficient for any quantity of words less than 30 folios, instead of merely a quantity not exceeding 15 folios. But in lieu of the lesser rate of 1\(\frac{1}{4}\), 6\(\frac{1}{2}\), in any quantity, and of 1\(\frac{1}{2}\), for every additional quantity of 15 folios, the duty is now 2\(\frac{1}{2}\), 6\(\frac{1}{2}\), for every such further quantity.

The advantage of this may be illustrated by the following example. A contract for the performance of any work according to plan and specification, the words and figures amounting altogether to 100 folios, the duty under the old law woul have been 1\(\frac{1}{2}\), and five times 1\(\frac{1}{2}\) for five entire quantities of 15 folios after the first, making altogether in all the new law the imposed duty is increased 2\(\frac{1}{2}\), twice 6\(\frac{1}{2}\), making only 15\(\frac{1}{2}\).

Charter, Precept, Resignation, and Seisin.—The duties on certain instruments in Scotland under these heads, are reduced from 3\(\frac{1}{2}\), to 2\(\frac{1}{2}\).

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 1\(\frac{1}{2}\) to 5\(\times\), where the duty on the principal instrument exceeds that amount; and also, where it is given for money exceeding 500\(\times\), 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 1\(\frac{1}{2}\), which is an increase, the former duty in such case being 1\(\frac{1}{2}\) only.

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.

All the duties on the former Acts relating to Stamp Duties are kept in force, including exemptions.

Certain agreements for letting 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 2\(\frac{1}{2}\) 6\(\frac{1}{2}\), 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 mort, ages, 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 allowed to, but, in the cases of those acts 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 10\(\frac{1}{2}\); upon payment of which and the duty, the stamp may be affixed. By the new Act the penalty is 10\(\frac{1}{2}\); and where the duty required exceeds 10\(\frac{1}{2}\), then, further interest at 6\(\frac{1}{2}\) per cent. per annum on the duty, calculated from the date of first execution or instrument, but no amount of interest beyond that of 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 furnished. The advantage to the party is the same. Under the new 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 before the Act; 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 the procedure had 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 an instrument is duly stamped, and so to preclude all question upon the point. The fee for obtaining this adjudication is 10\(\frac{1}{2}\). 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 7\(\frac{1}{4}\), 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; they were all formerly required, to be obtained annually, but by the new Act a licence is for 7\(\frac{1}{4}\) such a licence in Great Britain were to be permanent; the same provision is by the recent Act made as to Ireland.

One or two examples have already been given of the benefit to be derived from the new duty in particular transactions of small value; it will be well to furnish an instance or two more.

Take the case of a sale of a freehold property for 1500\(\times\), the conveyance consisting of 40 folios, that is one entire quantity of 15 folios after the first, and requiring, therefore, one progressive duty. Under the old law the duties would be as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad valorem duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Progressive duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Total</td>
<td>1 (\frac{1}{2}).</td>
</tr>
</tbody>
</table>

Under the new Act the duties are:

<table>
<thead>
<tr>
<th>Description</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad valorem duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Progressive duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Total</td>
<td>1 (\frac{1}{2}).</td>
</tr>
</tbody>
</table>

Again, take a mortgage of a freehold estate for the same sum. The duties were the same in amount as on a sale, viz.:—

<table>
<thead>
<tr>
<th>Description</th>
<th>Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad valorem duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Progressive duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Lease for a year duty</td>
<td>0 (\frac{1}{2}).</td>
</tr>
<tr>
<td>Total</td>
<td>1 (\frac{1}{2}).</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 40\(\times\) and upwards to an uniform rate of 1\(\frac{1}{2}\). The stamp may be either impressed or affixed, but must not be cancelled by the signature, and a penalty of 10\(\times\) 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 2\(\frac{1}{2}\); debentures or certificates for drawbounts or bounties, 1\(\frac{1}{4}\); not exceeding 10\(\times\), 2\(\frac{1}{2}\); above 10\(\times\) and not exceeding 50\(\times\), and 5\(\times\), if above 50\(\times\); drafts or orders for payment of money on demand, 1\(\frac{1}{4}\); 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 bear a penny stamp; policies of assurance 5\(\frac{1}{2}\); 500\(\times\), up to 1000\(\times\); for every additional 1000\(\times\), up to 10000\(\times\), and 10\(\frac{1}{2}\) for every additional 1000\(\times\). (The fractional parts in each case carry the additional stamp). By cap. 63 the stamp on articles of attorney's clerk was reduced from 12\(\frac{1}{2}\) to 5\(\frac{1}{2}\); attorneys and conveyancers' certificates were lower—ed; and also the conveyance duties on feu-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
(§ 8) 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 50L. Bills purporting to be
drawn in sets (§ 6) must be so drawn under a penalty of
100L. Unstamped drafts on bankers (§ 7) are not to be
circulated beyond fifteen miles from the place where
payable, under a penalty of 50L; but drafts (§ 8) law-
fully 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 (§ 19), 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 pawnbrokers' licences in Dublin (§ 20) is reduced
from 15L. to 7L. 10s. Instruments liable to stamp duty (§ 37)
are to be admitted in evidence in any criminal proceeding
although they be not stamped.

Schedule.—Inland bill of 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>£</th>
<th>£ a. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not exceeding</td>
<td>5 0 0</td>
</tr>
<tr>
<td>Exceeding 25 and not exceeding</td>
<td>10 0 0</td>
</tr>
<tr>
<td>10</td>
<td>25 0 0</td>
</tr>
<tr>
<td>25</td>
<td>50 0 0</td>
</tr>
<tr>
<td>50</td>
<td>75 0 0</td>
</tr>
<tr>
<td>75</td>
<td>100 0 0</td>
</tr>
<tr>
<td>100</td>
<td>200 0 0</td>
</tr>
<tr>
<td>200</td>
<td>300 0 0</td>
</tr>
<tr>
<td>500</td>
<td>400 0 0</td>
</tr>
<tr>
<td>1,000</td>
<td>500 0 0</td>
</tr>
<tr>
<td>2,000</td>
<td>600 0 0</td>
</tr>
<tr>
<td>3,000</td>
<td>700 0 0</td>
</tr>
<tr>
<td>4,000 and upwards</td>
<td>800 0 0</td>
</tr>
</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 thereby shall not exceed 25
And where it shall exceed £25 and not exceed 50
<table>
<thead>
<tr>
<th>£</th>
<th>£ a. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>75 0 0</td>
</tr>
<tr>
<td>100</td>
<td>100 0 0</td>
</tr>
<tr>
<td>200</td>
<td>200 0 0</td>
</tr>
<tr>
<td>500</td>
<td>500 0 0</td>
</tr>
<tr>
<td>1,000</td>
<td>1,000 0 0</td>
</tr>
<tr>
<td>2,000</td>
<td>2,000 0 0</td>
</tr>
<tr>
<td>3,000</td>
<td>3,000 0 0</td>
</tr>
<tr>
<td>4,000 and upwards</td>
<td>4,000 0 0</td>
</tr>
</tbody>
</table>

Foreign bill of exchange drawn out of the United Kingdom,
and payable, within the United Kingdom, the same
duty as on an inland bill of the same amount and tenor.

Foreign bill of exchange drawn out of the United King-
dom, and payable out of the United Kingdom, but inadver-
ded or negotiated within the United Kingdom, the same
duty as a foreign bill drawn within the United Kingdom,
and payable out of the United Kingdom.

Promissory note for the payment in any other manner than
the bearer on demand of any sum of money,

<table>
<thead>
<tr>
<th>£</th>
<th>£ a. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not exceeding</td>
<td>5 0 0</td>
</tr>
<tr>
<td>Exceeding £25 and not exceeding</td>
<td>10 0 0</td>
</tr>
<tr>
<td>10</td>
<td>25 0 0</td>
</tr>
<tr>
<td>25</td>
<td>50 0 0</td>
</tr>
<tr>
<td>50</td>
<td>75 0 0</td>
</tr>
<tr>
<td>75</td>
<td>100 0 0</td>
</tr>
</tbody>
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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>£</th>
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<td>Exceeding £100 and not exceeding</td>
<td>200 0 0</td>
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<td>200</td>
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<td>3,250</td>
<td>4,000 0 0</td>
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Lease or tack of any lands, tenements, hereditaments, or
heritable subjects, for any term of years exceeding thirty-
five, at a yearly rent, with or without any yard, in Ireland
by way of fine, premium, or grasmum paid for the same,
the following duties in respect of such yearly rent:

<table>
<thead>
<tr>
<th>£</th>
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<tr>
<td>And where the yearly rent shall not exceed 50</td>
<td>3 0 0</td>
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<tr>
<td>And where it shall exceed £50 and not exceed 100</td>
<td>10 0 0</td>
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<td>10</td>
<td>15 0 0</td>
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<td>20</td>
<td>25 0 0</td>
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<td>50</td>
<td>75 0 0</td>
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<td>75</td>
<td>100 0 0</td>
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And where the same shall exceed £100, then
<table>
<thead>
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<th>£</th>
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<tr>
<td>for every £250</td>
<td>5 0 0</td>
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<tr>
<td>and also for every fractional part of £250</td>
<td>1 0 0</td>
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And where any such lease or tack as aforesaid shall be
granted in consideration of a fine, premium, or grasmum,
and also at a yearly rent, such lease or tack shall be
chargeable also, in respect of such fine, premium, or
grasmum, with the ad se laesum stamp duties granted under
the head or title of "conveyance" in the schedule an-
nexed 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.
Covenants of any kind or description whatsoever in
England or Ireland, and charter, disposition, or contract
containing the first original constitution of any ground
annual rights in Scotland (not being a lease or tack for years),
in consideration of an annual sum payable in perpetuity or
for any indefinite period, whether fee farm or other rent, feu
duty, ground annual, or otherwise. The same duties as on
a lease or tack for a term 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 fee tail to the holder
of the fee simple, or to the tenant for life, 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 which the same were subject and liable before the passing
of the Act 16 & 17 Vict. c. 63.

Every such lease or tack, and every such conveyance,
charter, disposition, or contract as aforesaid hereby charged
with duty, and any conveyance or counterpart hereon ex-
clusively, shall be chargeable with the respective stamp duties
granted and made payable under the several heads or titles of
"Duplicator or Counterpart," and "Progressive Duty," in
the schedule annexed to the 13 & 14 Vict. c. 97.

License to demise copyhold lands, tenements, or her-
editaments, 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
75L. 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 all other cases.

STANDARD MEASURE, WEIGHT, &c. The imperial
standard yard, and standard pound Troy having been de-
arroyed in the fire at the Houses of Parliament in 1834, and doubts moreover existing as to the accuracy of the methods which had been provided by the act 5 Geo. IV. c. 74, for ascertaining the standard, scientific men have con-
structed a new standard yard and pound, which have been reconstituted in England and America. The star, which had been deposited in various places, now constitute the standard of measure and weight of the United Kingdom; 18 & 19 Vict. c. 72.  

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 Penshaw in Anglesia. His father had been an officer in the army for some years after his death, was raised to the peerage in 1839 by the title of Baron Stanley of Alderley. In his boyhood the future bishop had a passion for the sea and he 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 1806. In that year,—having meanwhile travelled on the Continent and having had for some time the curacy of Wendlesham, in Surrey,—he was presented by his father to the family living of Alderley. In 1810 he married Catherine, eldest daughter of the Rev. Osward Leycester, rector of Stoke-upon-Trent, Shropshire. He was then 31 years of age. In 1814 he was installed in the see of Chester for the 18 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—wholesome, moral, and industrious. He, perhaps less 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 other periodicals. In 1816 he published 'Blackwood,' entitled 'An Adventure 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 the Roman Catholic Church he privately cultivated was ornithology; and in 1833 he published under the auspices 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 Linnean Society. Though never obturating his politics on his parishioners, he took part on the liberal side on some of the questions of the day relating to the Church. In 1823 he had published 'A Few Words in favour of our Roman Catholic Brethren,' advocating Roman Catholic Emancipation. In 1835 he published 'A Few Notes on Religion and Education in Ireland.' The spirit shown in these pamphlets, taken along with his excellent character, and his family-connections, rendered it difficult for W his government to find a man for a vacant bishopric; and when at length the 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 so long to purvey to the interests of the see of Norwich. He was created a baronet by 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

bisher, or one more sanguine in all schemes of improvement. He abandoned his pursuit of natural history and devoted himself exclusively to diocesan business. At the present bishop had lived to the age of ninety-three, there would necessarily great abuses in the diocese—abuses of none would be greater than the tendency 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, and he was adherent of latitudinarianism. In the severe deviation from any of the standards of the Church the charge was untrue; and nothing but the tolerance of his disputations in all non-essential matters gave any colour to it. Beloved by all the people, he was highly esteemed by the reputation of being one of the most kindly, sanguine, and hospitable men in the Church, he lived till 1849, when he died unexpectedly on the 6th of September at Brahan Castle in Ross-shire, Scotland, where he was then on a visit. He left five children—three sons and two daughters. His eldest son, Owen STANLEY, entered the navy, where he rose to the rank of captain. He was a man of very considerable scientific attainments, and was regarded as an officer of unusual promise. He had been engaged on various voyages on the coast of Australia, which he had just completed, when he died somewhat suddenly in 1849, his death being apparently hastened by the labours of the survey. Bishop Stanley's youngest son, Charles Edward, is in the Royal Engineers, and was created a baronet in 1899. He is Regius Professor of Ecclesiastical History at Oxford, and the foregoing particulars have been derived from a memoir prefixed by him to a collection of his father's "Addresses and Charges" published in 1861. Of the bishop's writings his History of the Church of England is perhaps the most important through several editions. Among his various pamphlets and sermons may be noted his 'Heads for the Arrangement of Local Information in every Department of Parochial and Rural Interest,' published in 1860.

STANNARY COURTS. The jurisdiction of the Stannary Courts has been extended, and their procedure amended and improved by the statute 18 & 19 Vict. c. 33.

STARCH. [Timus, Organic, s. l.]

STAYNTON OF FRAS. The importunities of this state have been extended by the Mercantile Law Amendment Act, 1856, and the law as to guarantees considerably improved. The alterations thus effected are, however, so entirely technical that the reader can only be referred to them.

STATUTE OF LIMITATIONS. The Mercantile Law Amendment Act, 1856, has removed some of the anomalies which have arisen upon these statutes, but any explanation of the statutes of limitation in the narrower sense, is beyond the scope of this work, as it reaches little beyond the limits of their application in its nature, and require too much space to be given here. It may be enough to state, that the general effect of all the enactments of the statute is to remove certain nice legal distinctions and difficulties, which formerly in many cases served only to confound the simplicity of antient law.

STEFFENS, Heinrich, was born at Stavanger in Norway on May 2, 1773. His parents removed in 1779 to Helingör, where he received his early education, and in 1787 he was taken to Copenhagen, as his early-discovered piety and eloquence seemed to point out divinity as his proper study, though he had already acquired a great fondness for natural history. In 1790 he was entered at the University of Copenhagen, where he so distinguished himself that he was at once placed in Schelling's class. On the 1st of July of that year at Bergen in Norway, and in the autumn while proceeding to Germany he suffered shipwreck at the mouth of the Elbe, saving only his life, and that with difficulty. After residing about a year in the country, he returned to Knip, where in 1796 he gave lectures in natural history, and acted as private tutor. He however felt a want of a fundamental principle in natural science, and, repairing to Jena, imagined that he found in the theories of Schelling what he needed. He was a disciple of Schelling's, and at an early age was initiated into the secret principles of the natural philosophy, and became one of the warmest supporters of the doctrines of Schelling's school (then in its most flourishing state), at least so far as they were restricted to natural philosophy. He preferred the philosophy of the professor of philosophy in the University of Jena, he repaired to Freiberg, where he was instructed by and acquired the friendship of Werner. While here he wrote his 'Geog-

Geognostische-Geologische Aufsätze' (Geognostic-Geological
Essays), not published till 1810, which he expanded in 1811-19 into three volumes of a 'Handbuch der Oryktognosie.' On returning to Denmark in 1808, 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 Copenhagen to the professorship, which he there published (in 1806) his 'Grundzüge der philosophischen Naturwissenschaft.' ('Fundamental Features of Philosophical Natural Science'). The years 1807-9 he spent with his friends in Holstein. He returned to Halle, and took an extreme part, not unattended with danger, in 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, Steffens joined the revolutionaries, but was overtaken by Staatsische arreßes 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 1821, 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, huge volumes which he never thought to elucidate on philosophical principles the existence of mankind in connection with the universe. This subject he continued in his 'Polemische Blätter zur Beförderung der spekulative Physik' (Polemical Leaves for the advancement of Speculative Physics), in the year 1835; 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 Steffens however, at an age when a number of contemporaries were hailed and frequently and successfully appealed to the present 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'), in 1805; his 'Die gegenwärtige Lage unseres Religionswesens,' in 1835; and 'Die geheime Verbindung auf Universitäten' ('On the secret Societies of the Universities'), in 1835. His distincation afterwards at Berlin and afterwards at Kiel was 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 publication of his work 'Von der falschen Theologie und dem wahren Glauben' ('On the False Theology and the True Faith'), in 1824, of which more than one edition has been called for. In 1831 he published 'Wie ich wieder Luthernar wurde und war mir das Lutherthum ist' ('How I became again a Lutheran, and what Lutheranism is to me'), which is a personal and fascinating account of his change of faith, and one of the finest examples of the personality of the Deity. In 1837 also he struck into a new line: he began a series of novels, of which the first 'Die Familien Walseß und Leith,' in three volumes, was followed in 1838 by 'Die vier Norwegern,' 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, and a sentiment which makes them especially that of his native country in 'The Four Norwegians,' 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 erlebte,' 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,' and published in 1841. He died at Berlin in 1845. His works are still read and valued, and his views are often referred to in the discussions of natural history, and was the author of a continuation 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 at the age of 80 in 1849 from a fever, 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 Isabella, daughter of Mabel Catesby. He was born at Wath in 1781, and at an early age acquired a great talent for mechanical work. In 1809 he commenced at an early age 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 heard, and from these sources of information, through e.g. 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 complete culture. He attended a small school at Whalbottle, 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, and there acquired a perfect knowledge of metric, which he acquired with remarkable facility. At twenty 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, full of energy 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 wife's plea for his protection secured him ever after from a repetition of the offence. When by the most rigid economy Stephenson had saved sufficient money to furnish a small home, he determined to settle, and on the 26th of November 1808 he married Fanny Henderson, who subsequently removed with him to Newcastle, where he had been appointed brakesman to the engine employed for lifting the ballast brought by the return collier ships to Newcaste. In his new abode at the Ballast Hills, he continued to occupy himself with mechanical experiments, depending
much time and great ingenuity in a fruitless effort to obtain perpetual motion; until an accident having obliged him to repair his own clock, he became the general clock-cleaner and clock-repairer of the town; and the fruit of this mechanical skill whilst adding to his income. On the 16th of December 1803 his only child Robert was born, and soon after he removed to Killingworth, where his wife died. In 1815 Mr. Stephenson had the opportunity of obtaining a share in the Lloyd's engine, one of the famous Boulton & Watt's engines at Montrose; but after continuing there a year—during which time he saved about $25, a considerable sum in his circumstances, and during a period of war-provisions—he returned to Killingworth to find his debts at the expense of more than half his savings, and sold his premises, having been insolvent, and sealed and blinded by a discharge of steam, let in upon him while repairing an engine. Stephenson paid his father's debts at the expense of more than half his savings, and sold his premises, having been insolvent, and sealed and blinded by a discharge of steam, let in upon him while repairing an engine.

The construction of railroads had for some time occupied much of the public attention. In 1829 the owners of the Colliery, desiring to 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 maximum being about 1 in 20. In January 1830 the road was opened for traffic. 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 an easy working of the engine were not altogether realized. He began the work in May 1829, but in 1832 an amendment to the Bill for the line with locomotives, which Mr. Stephenson was appointed resident engineer for the line, was struck out per annum, and upon that appointment he removed to Killingworth. In September, 1835, 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 for an Act. A strong opposition was raised both within the House of Commons and without. Landowners drove the
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 prevailed upon the Directors to offer a prize for a locomotive engine, conforming to certain conditions, which was done, and the prize was won by the Rocket engine, in the construction of which he had assisted 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 Tipton in Derbyshire, where he commenced a fresh pursuit in working the Clay Cross colliers. At this time he took much interest in the well-doing of the Mechanics' Institutes in his neighbourhood, and on more than one occasion related to them the circumstances of his own career, as an encouragement to the members to adopt a course of study, and to avail themselves of the opportunities in their way. His extension 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 Newcastie and Edinburgh East Coast Line, with whom his farm and gardens, and indulged in his old fancy for keeping birds and animals. With the exception of promoting the Ambagrate and Manchester Railway, inventing a new self-acting break, 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 projectionists and inventors of all kinds, to whom however he was invariably attentive and kind, he passed the remainder of his days in pleasant retirement. The invention of the steam-engine excited great interest in the Institution of Mechanical Engineers of Birmingham, which he had founded, and was President of. He died after a short illness on August 12, 1848, leaving a name rendered illustrious by the patient perseverance of a high and virtuous mind and the contemplation 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 στερεός (solid) and σύνε (a view, or σύνεντυς to 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 and solidity.

To see with two eyes, that only a single representation of the object is presented to the mind, must 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-stated one point as from the position, 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 scoliony a closer identification between the actions of the natural philosophy, references more or less full and direct to the subject, and speculations as to the cause. Euclidian showed by means of a sphere that each eye sees a dissimilar representation of an object; and Galen some centuries later explained the matter, by saying that the 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 conceived of as relief. At the end of the 18th century, Leonardo da Vinci, and in the 18th and following centuries, Baptista Porta and Agnionius 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 accept the opinion that each eye sees an object at a time. The whole question of vision by one and by two eyes, of monocular and binocular vision, was re-opened by Mr. Wheatstone,—to whom the world is indebted for the application of electricity to telegraphic purposes,—in a paper entitled ' Contributions to the Phenomena of Binocular Vision.' Remarkable and hitherto Unobserved Phenomena of Binocular Vision,' read before the Royal Society, June 21st, 1838, and again, before the British Association at Newcastle, in October, 1839. The following letter was printed in the 'Philosophical Transactions' a few 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 there being a dissimilar picture of the object projected simultaneously on the retina of each eye, the optic axes of which are not parallel; whereas in viewing a pictorial representation two similar pictures are projected on the retina, and hence the resultant flatness. It is not necessary to enter further upon his views, nor upon the theory of vision generally, as the subject has been treated of fully under the head Stereoscopic, 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, which he called the Reflecting Stereoscope. This instrument, now known as the Reflecting 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 a mahogany case. When the two mirrors are turned to the plane of the paper, they 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 his eyes as close as he can to the mirrors, the angle of which must coincide with the middle line of his face and forehead, the two dissimilar pictures united, so as to give the appearance of the object represented, not as it is seen depinned on a plane surface, but with all the solidity of the object 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 curious as well as expensive optical toy. For most purposes it has been superseded by the more conversational and more popular form of the instrument, known as the Lenticular Stereoscope, among others of that exhibiting photographs of any size.

For the Reflecting Stereoscope we are indebted to the inventor of another very beautiful contrivance, the Kaleidoscope [Kaleidoscope, S. 1, p. 123]. Sir David Brewster having taken certain photographs, by photographing these, he 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 ultimately assumed, he called the Lenticular Stereoscope. He early exhibited his instrument in his classes at St. Andrew'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 the Representation of Solid Figures by the union of Dissimilar Plane Figures on the Retina,' which he communicated to the Royal Society of Edinburgh in January 1843. He further explained and illustrated his views in many subsequent papers, which, like the forms, were published in the Edinburgh 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 followed among philosophers and the leaders of popular theories of binocular vision, and their respective claims as the inventors of the stereoscope, we shall not enter: the opinions of Sir David Brewster, in their matured and digested form, will be found amply set forth in his work 'The Stereoscope,' (1853), and in a subsequent paper, reprinted in the paper already referred to, and in another which formed the Bakerian Lecture of the Royal Society for 1856, 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 picture is to be viewed. The box is opened, and the light pass through 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 blackened, and little vessels, or other receptacles, may be obtained for containing a semi-lens or quarter-lens. These two 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 stereoscope has wonderfully extended the range of the instrument, and now, what has been already explained to you, taken the 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 social amusement, rightly used, an extremely valuable means of instruction.

In describing the instrument, it was said that each of the eye-pieces contained a semi-lens. It 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 in their superposition on that middle point, produces the stereoscopic effect. The two 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 act may be understood by a very simple experiment. In 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 square, the coin will be seen some distance on the left of its true position, but the left half of the coin will 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 uncovered half with the left eye only, the coin will be seen some distance on the right side of its true position. Just so the half lenses in the eye-pieces of the stereoscope—which are placed 2½ inches apart, corresponding to the distance between the eyes—make the two pictures in the mind to approach and become superimposed on each other. But as the pictures are strictly 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 the picture on the right side, and that portion of the left side which the left eye sees, in the other, 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 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 arrived at—namely, an employment of larger lenses, the changing its frame from a pyramid to another oblique form, &c.—but the principle is the same in all, and some of the changes are certainly not improvements.

What has been said, an attentive reader will have no doubt drawn the inference that the production of a 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, statuary, &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 by the camera of the first picture, either more or less distant from the first point 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 50 feet or more distant, some writers having thought that the angle might be increased to a distance of 4 feet, in order to take views of an object only 20 feet distant. But the effect of such an arrangement is obviously to make one picture represent much more of the object than falls within the field of vision, than could be seen by a person standing, say midway, between the two positions. And the two pictures thus taken were, 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 often and very properly, 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 they would appear to a person standing midway between the two positions. But to exhibit 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 is to view the objects of the ordinary traveller, 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 and more apparent. It will be enough to allude, as illustrating this, to the recently published views in Egypt, in which the antiquities 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. Piazza 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 Scotch descent; and his father, Edward Sterling (afterwards well known as a cavalry officer, and a prominent advocate of the Emancipation Bill) then 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. John was the second son of the family; the second child of seven, five of whom died while he was still a youth, leaving only himself and an elder brother. In 1809, the family removed to Llanlethen, 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 England. His son John, from Pimperne in Somerset, and from Elba, and the resumption of the war, the family in 1815 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 Harris, afterwards Archdeacon of Lewes, was his tutor, and here he formed the acquaintance of the great Ridgley, Smollett, Canning, and others. After graduating, he was called to the bar; and in 1827 he was elected to one of the seats in the House of Commons, representing the county of York. In 1830, he was appointed to the office of Solicitor to the Board of Admiralty, and it was here perhaps that he first exhibited the qualities of intellect and character which made him afterwards socially celebrated. From Trinity College, Sterling removed, also with his friend Maurice, to Trinity Hall, with an afterwards of studying law; but in 1827 he left Cambridge altogether.
without taking his degree. In 1889 the 'Athensmum,' 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 soon reconstituted by others. It was not absolutely necessary that he should engage 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 Sterling himself had made. In 1844, he published 'Liberum Vivere,' the characteristic.

It was about the year 1828 that he first became acquainted with Coleridge, then living his recluse life at Highgate; and Coleridge's influence on Sterling was great, and made its mark on him for the rest of his life. A collection of his 'Essays and Tales' from the 'Athensmum,' 'Blackwood,' and other periodicals, was edited in two volumes, with a memoir prefixed, by Archdeacon Hare, in 1843; the well-known 'Life of Sterling' by Mr. Carlyle, representing the man less in detail than in his general human relations, appeared in 1851; and in the same year 'Twelve Letters by John Sterling' were edited by his relative Mr. Coningham of Brighton.

STEVENBERGTE. [MINERALOGY, S. 1.]

STEVENSON, ROBERT, the celebrated engineer of the Bell Rock Lighthouse, was born at Glasgow on June 8, 1772. His education was conducted under the care of his mother (his father having died when he was young), and when complete he was placed under Mr. Theodorus Rothe, who 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 removed to the Northern Lighthouse Commissioners, Stevenson became his assistant; and when only nineteen had the superintendence of the construction of the lighthouse on the island of Little Cumbrae, in the Frith of Clyde, between the southern point of the Isle of Bute and the Ardrossan Harbours. In 1794, a few miles off Arbroath in Forfarshire, having 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 successively overcome, and an account of the details of the erection and structure, illustrated with plates, was published at Edinburgh in 1824. A controversy has arisen as to the originality of Mr. Stevenson's plans, into which we cannot enter, but it is certain that he himself from the very beginning always endeavored 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. Will he be long remembered as the inventor of the 'long swing' lines of ropes used in Edinburgh 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 then in use. In 1826 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 16th of June, 1854. The Bell Rock and Lighthouses passed a resolution acknowledging his great services and merits. He left sons, whom he had brought up to his own profession, who worthy sustain the reputation of their father.
STOCKS. [MATTHIA].

STOCKS, JOHN E., M.D., was born in 1822. He was educated for the medical profession at University College, London, and in 1843, returned to India, especially attached himself to the study of botany. 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 cultivation and natural history of the country, and on specimens and information. 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 Dillingham, near Lymington, Hampshire, in 1865.

STOCKTON. [CALIFORNIA, S. 2].

STOODART, 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 Wilthare, 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 elected at Christ Church 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 1798, and D.C.L. in 1801. In the meantime he had not neglected general literature, and in 1796 and 1798 he had published two dissertations on the Benedictine pronunciation of the Greek, and on the German pronunciation of 'Der', in connexion with Dr. S. Worms, to which only 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 Views and the Principles of the Executive Directory of France, with the Lives of the present Members.' In 1801 he admitted a member of the College of Advocates, and published Remarks on Local Scenery and Manners in Scotland, during the years 1797 and 1800. 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 was appointed a judge of the Court of Directors. In 1810 he commenced writing upon political subjects in the Times newspaper, his contributions being marked J. S., 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 felicity, too often found on more prejudice, that occasioned his receiving the sobriquet of Dr. Slop, and as such he was besieged by George Cruikshank to illustrate the caricatures published by Hose. Dr. Stoddart is said to have taken a lively interest in the publication of his political editorials. He held this important post till the close of 1816, when, in consequence, it is said, of the disapproval of the proprietors of the continued violence of his attacks on the now imprisoned emperors, 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 1826 he was appointed chief-justice and judge of the Court of Directors of the Port of Malta, being knighted at the same time, and in that office distinguished himself by the able and conscientious manner in which he discharged his duties, until his return to England in 1839. 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 the Study of the correspondence of the British and the Science of Language, which were printed in the Encyclopædia Metropolitana, but have likewise appeared as separate works. A Statistical, Administrative, and Commercial Chart of the United Kingdom, compiled from parliamentary and other authorities, was one of his last productions. He died at Brompton-square, near London, on February 16, 1856; and on the first meeting of the Law Amendment Society after his death, Lord Brougham pronounced an eulogy on his memory.

STOKESLEY. [ YORKSHIRE].

STONECROP. [Sedum].

STOWE. [Tulip].

STRAHOMIN. [Chemistry, S. 1].

STRANGFORD, PERCY CLINTON SYDNEY SMYTHIE, SIXTH VISOUNT, was born in 1780, and graduated in 1800 at Trinity College, Dublin, obtaining the gold medal for the best performance for the degree of Bachelor of Arts, and the diploma of the University. He was early attached to the study of botany. 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 cultivation and natural history of the country, and on specimens and information. 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 Dillingham, near Lymington, Hampshire, in 1865.

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STOKE POGES. [BUCKINGHAMSHIRE].
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On the failure of the health of Dr. Buckland, Mr. Strickland was appointed reader in geology in the University of Oxford, and he was immediately set to work on his book. Amongst these the following were published in the 'Proceedings of the Zoological Society.' 'Descriptions of New Species of Birds from West Africa.' 'Notes on a certain species of Sperm whale, and description of the whale.' These were published by him in the 'Annals and Magazine of Natural History,' in Jardine's 'Contributions to Ornithology,' and in other works.

Whilst at Oxford his attention had often been directed to the head and feet of the Dodo, the only existing remains of a bird that had ceased to exist within a comparatively recent period. These remains had occupied the attention of naturalists, and many conjectures had been made as to the exact nature of this bird. Mr. Strickland expended much labour and ingenuity in getting together all the facts that existed with regard to the history and disappearance of this bird [Dana, vol. xx. pp. 47, 55], published a volume on the subject, entitled 'The Dodo and its Kindred,' and produced a series of natural history studies, which are not confined to the subject of extinct Birds,' London, 4to, 1848. This work contained copies from drawings of this bird, and a discussion on its zoological affinities, and the conclusion of the author that it belonged to the family of Columbidae or Dores. In the conclusion of this monograph some new and interesting ideas are introduced. During his life Mr. Strickland was engaged in preparing a large work on the synonymy of the family of birds, one volume of which has been published since his death.

The original list of works in this book was increased by Mr. Strickland at least one third. His own publications, the list of which was published in the fourth volume and after his death, amounted to eighty-six. He was cut off in the midst of his labor of usefulness. He had been attending the meeting of the British Association for the Advancement of Science held in the year 1853 at Hull. He wished to inspect the cuttings of the Gainsborough and Retford Railway, and whilst thus engaged, note-book in hand, he was killed by a common pole, on that line, he was run over by a passenger train, and killed on the spot, Sept. 14, 1853. He was married in 1846 to the second daughter of Sir William Jardine, Bart., but left no children.

STROMATA, the name of an Earth, composed of Oxygen of Iron. This post he held at the time of his death 1853 at Hull. He wished to inspect the cuttings of the Gainsborough and Retford Railway, and whilst thus engaged, note-book in hand, he was killed by a common pole, on that line, he was run over by a passenger train, and killed on the spot, Sept. 14, 1853. He was married in 1846 to the second daughter of Sir William Jardine, Bart., but left no children.

STROMATITE—Carbonate of Stromita—occurs in modified rhombic prisms. It occurs also fibrous and granular, and sometimes in globular shapes with a radiated structure within.

The colour is usually a light tinge of green; also white, gray, and yellowish-brown. Lustre vitreous, or somewhat resinous. Transparent to translucent. Hardness 3 or 4.

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The first announcement of the theorem (in the English language) was not made until 1855, when Professor J. R. 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 complete theoretical proof of the theorem was given by Sturm himself; his own work was in great part printed, and disregarding a disparaging 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 suspension of all other work for the sake of having his discovery be published. This he received in July, and his own work was published in August. To the appreciation and zeal of this analyst, whose recognition and promotion of the theorem was of such importance, must be attributed the simultaneous, British mathematicians, as well as M. Sturm 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 exciting 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 to extend the importance of this important theorem among British analysts; and although it has been since dispersed and undervalued in certain quarters, I have always entertained the conviction that it must eventually supersede every other analytic method for the solution of such equations as a numerical equation." In Professor Young's subsequent introductory volume on "The Analysis and Solution of Cubic and Biquadratic Equations," published at the beginning of 1844, he invited the attention of the young analysts to the following theorem, which he had discovered, as an alternative method to the 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 the general method and the previous theories of Budan and Fourier.

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 native competitors. It is right to mention, 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 that they were refused two prizes, and 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 Lacroix".

The first 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, and the application of analytical methods to several 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 the geometrical and analytical elegance with which many questions subsidiary 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. The importance of this memoir on this subject: Dr. Young himself, it must be remembered, once relinquished his belief in the muscularity of the lens, though he finally renewed it.

Sturm, in his memoir, has been visited by the mathematicians with whom he conversed a high 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 1861, probably in
consequence of his laudable public employment's and the unmitting severity of his studies. He died on the 18th of December 1855, to the deep regret of a large circle of friends and pupils, to whom he appears to have been singularly exalted by the modesty, truthfulness, and simplicity of his character.

STURMIA, a genus of plants belonging to the natural order Orchidaceae and the tribe Malabadsineae. It has a patent perianth; lip anterior, erect or oblique, entire, dilated, much longer than the others; sepals in the line of the lip; petals 5, ovate, in the whitish sheaths of the sepaled leaves. If to the Lepidium of some authors. It is found in sappy woods in Norfolk, Suffolk, and Cambridgeshire, but is very rare. (Ibigneb, Manual of British Botany.)

SUCCESSION DUTIES. For many years persons succeeding to personal property (including leases), whether they took by will as executors or legatees, or merely as administrators or next of kin, were charged with Lease Duty on the real estate in the hands or under the control of the predecessor. The exemption of real estate from this species of taxation, long complained of as creating an undue preference in favour of the holders of landed property, has at last been removed. By the Succession Duties Act, 1855, duties are imposed on every succession to property, whether real or personal, according to the value and the relationship of the parties to the predecessor. Where the successor is the lineal issue or lineal ancestor of the predecessor, 1d. per cent.; where a brother or sister, or a descendant of a brother or sister, 3d. per cent.; where a brother or sister of the father or mother, or a descendant of the brother or sister of the father or mother of the predecessor, 6d. per cent.; where a brother or sister of the grandfather or grandmother, or a descendant of the brother or sister of the grandfather or grandmother of the predecessor, 6d. per cent.; and where the successor is in any other degree of collateral consanguinity to the predecessor, or is a stranger in blood to him, 10d. per cent. The value of the succession, if it be real property, is ascertained by considering the interest of the successor as of the value of an annuity equal to the annual value of the property, estimated as the Act directs; and the duty may be paid by eight equal half-yearly installments, or at once, according to the wishes of the party liable thereto.

SUE, the popular romancist, was born at Paris Dec. 10, 1804. His ancestors, who came from Lacolle, near Cannes, in the south of France, settled in the French capital at the beginning of the 18th century, and having acquired some property, were the parents of respectable physicians, two of whom became celebrated, 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 Hôpital de la Maison 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 it was to the scientific and literary circles that the font by the Empress Josephine and his son Eugène Bonnaire, from whom he derives his Christian name.

Dr. Sue, having but two children—a son and a daughter—was too engaged in bringing up a family of the profession, and Eugène in conducting a medical practice at the Collège de France, 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 enter Spain under the Duke of Angouleme. In this campaign he was present at the siege of Cadiz and at the Tucaderal in 1833. In 1832 he quitted the land for the sea service, visited America, Asia, and the coast of the Mediterranean, in which he excelled, and which gave him that knowledge of ocean scenes and sailor life which he since described with indisputable power in his earlier tales. He was present in 1832 at the battle of Navarino, on board of the frigate Jeanne d'Arc, and was present at the capture of Tripoli at the age of sixty-nine, leaving to his son an unencumbered estate of 40,000 francs (1600L) a year, besides a splendid museum of anatomy, valued at several thousands more, bequeathed to the nation. Eugène Sue, at this time in his twenty-sixth year, was engaged to a young lady, Marie de Beauvais, who, at the time was the only child of a very wealthy family who had 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. About the same period he was an ardent painter, 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 1837, 'La Robe Blanche,' and 'La Salamandre.' 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 he suddenly became the idol of the nation. At that time he was 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 the Fanboug Saint-Germain.

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 books, and similar fiction—"le roman-feuilleton. Thus his 'Lacramont,' his 'Jean Cavalier,' his 'Commande' were published, and devoured from day to day by the public. His name had become a magnetic charm in the estimation of those speculators who had once rejected his manuscript. It was presumed that so popular a name was a guarantee for success in literary enterprises; and acting on this presumption, he was engaged at very high terms, having a reputation for concocting vivid scenes of naval adventure, to write a 'History of the French Navy.' But the speculator in this instance was disappointed: the public bought the first volume on account of the name, and refused to buy all the other volumes on account of the work. From 1832 to 1840, Eugène Sue had confined himself to that class of novel, and his books were generally 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, began to be noticed, and to make novel writers take more care of their work, to present a real life, or as the French call it, le Roman de Morue. He therefore resolved to adopt the new style, and to change we owe 'Arthur,' the 'Hôtel Lambert,' and 'Mathilde,' published in 1841 and 1842. Making allowance for those licences in morality which are too 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 admitted that the author is at his best. This novel possesses the charm of national colour, and the 'Wandering Jew.' These two novels originally appeared in the 'Journal des Debats' and the 'Constitutionnel,' occupying by their great length nearly three years in the course of publication. Including the interval between the conclusion of one number and the beginning of the next, the whole, the whole of the four years from 1842 to 1846 was taken up with these baleful writings, and the ferment and agitation of the public fancy was excited to the highest degree, with the result of a strong and spontaneous accession. The original edition was proposed and accepted for each of the four volumes at 100,000 francs (4000L); but it is understood that they were purposely extended and developed, on account of their unex-
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 1831 in the form of the "Constitutionnel," and "Les Sept 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 braved, 1866, "that he would show the fair side of all these sins;" for in these essays of a delightful and elegant piece of humor separate tales is 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 unnecessary of his reputation.

The "Mystères du Peuple," published in 1852, 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 the crises 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 after the election of Napoleon III. he took no part in politics. He died on Aug. 3, 1867.


SUNDREW. [Drosela, S. 1.] SUN-ROSE. [Helianthemum, S. 1.] SUNDAY. [Miscellaneous; and other liquors on Sunday are now regulated by the statutes 11 & 12 Vict. c. 49, and JS 19 Vict. c. 79.]

SURGERY. Some references which have been made in other parts of this work will here be made good.

Anus, Dis positioned or. The treatment of the most common 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 fissure or sinus by the side of the rectum. It sometimes opens externally, without communication with the bowel, and is then termed blind 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 general name of fistula is given to them. In this latter form pus, fistas, and fistulent matter, are discharged from the openings. It is accompanied by heat of the parts, great discomfort, and sometimes pain and spasm of the sphincter muscles. It is sometimes attended with acute inflamion and is a very serious complaint. When this kind of abscess 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 neighbouring 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 this disease.

The treatment of fistula is simple, and usually very successful. By laying open the whole of the sinus and dividing the bowel under which the main obstruction 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 laid open by the scarifying instrument. Usually not very 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.

Hemorrhage in an enlarged condition of the veins supplying the anus and rectum. This disease is divided into two kinds, external and internal. It seldom occurs before puberty, and is more common in females than males, and in rich and luxurious, than in the poor and hard-worked. Thus, whatever means are taken to determine blood to the lower part of the rectum, and to retard the return of blood from that part, favours this. Thus they come on 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.

Externally, this comes under a 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 rugous integument. The parts are sometimes inflamed, at other times free from any capillary dilatation, but more commonly they are all thickened and 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 "complete" and "incomplete.

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 by incision, and leaving them to heal in the ordinary way, or a ligature may be passed round the enlarged vessels, and the strangulated part left to bleed off. When this operation is not thought desirable, much may be done to relieve the enlargement and pain of piles by a pal- liative treatment. Whatever will remove the loading of the glands in the lower part of the bowels will relieve this thus. But parturition removes them when caused by pregnancy. If the part is inflamed, rest, purgatives, poliothesics, and med- ianeous applications may be had recourse to. Astringent appli- cations combined with opium may be applied, as gallic acid tannic acid, or a tincture of sarsaparilla, a cold pack of castor oil, or an electuary with the confect of saffron, sulphur, and cream of tartar. In cases where the liver is affected, the state of this organ should be especially at- tended to.

In the natural piles, are of three kinds: 1. Varicose veins sur- rounded by enlarged connective tissue, and covered by mucous membrane, and bleeding or blind. 2. Tumours the nature of sarcoma. 3. A congeries of blood-vessels resembling erectile tissue, and occurring in the submucous layers of the rectum. The third is the most common. They may protrude from the anus or not. When they do not, they descend occasionally when the bowels are acted on, and become very troublesome till they are returned. If protruded they are kept in by means of a water-soluble con- vulsion, or pitch. If the bowels are not acted on, these cases bleeding usually occurs when the bowels are acted on. When the tumours are replaced, no great in- convenience occurs. If, however, the bleeding continues, the patient becomes pale, thin, and weak; noises in the ear and heart may be heard; and in fact all the symptoms of anaemia set in.

The treatment in this case may be either palliative or radical. Frequently the latter course should at once be had recourse to. The internal tumours are seldom of a kind to allow of their removal, and 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 through the tumour and is tied round each half of the tumour. This operation is very painful, and difficult, and wherever circumstances will admit is greatly facilitated by the use of chloroform.

The operation opleia 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 treatment be had recourse to, all bowels under the head of external piles, must be attended to. Astringent remedies and opiates must be injected into the bowels. To the bowels must be regulated, the liver looked to, and when all of the stomach is irritated and the bowels are not kept under control, it will be necessary to have a ligature placed round the tumour, and not to allow it to protrude. When the tumours have retired, they must be treated as in internal cases.

Protoplasma Am is a very frequent and troublesome affection of the lower bowels. In consequence of relaxation the rectum passes down, and becoming exerted protrudes itself beneath the anal opening. This condition is called "Protoplasma Am an incomplete. It is called complete when the entire bowels come 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 most affected. The bowels in many cases pass into a membrane which passes down varies in size, from a mere annular enlargement to a tumour as large as a child's head. 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 dyspepsia are present.

The treatment, rather 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 to a state of health, and be done by purgation or lubricating the parts. When they are inflamed, 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 ligo matter forceps. They are generally removed through the replaced 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 imperforate anus, nothing more is required than an incision through the occluding 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 called obturated external anus. A second operation may be required to make a more serious operation than the last. The meconium 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 much dilated, and the rectum itself is filled up with the 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 tumours, or the impaction of foreign matters, the faecal matter cannot pass through the orifice, a colostomy or 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 easier 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 in cases of non-malignant tumours and other causes of the impaction of the lower bowel. In children with imperforate anus, however, it seldom succeeds, as other malformations often exist which speedily terminate the life of the infant.

Acute Aortitis, 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 excitation 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, and the latter operation may be employed. In the case of the aorta, the result is usually deleterious, as the aorta has no coats, and may also come on from a ligature being applied too tightly. In the treatment of such cases the ordinary remedies for inflammation should be applied. Cooling applications should be made to the part, and rest, and an antiphlogistic regimen may be employed. The spreading form of aortitis occurs in middle age in persons of broken constitution. It is seldom confined to one vessel, but affects the arteries of a whole limb. The tracks of the blood are frequently calcified, and the disease is fatal as the arteries become more and more condensed into mere fibrous bands. The whole constitutes a vascular network of great capacity and activity of circulation, supplied, for reception of the returned blood, with large and tortuous vessels, whose lining membrane is plainly conti-
tissues with that of the abnormal vascular cells. Also in the
nasal blood are to be found the feeding arteries; originally,
perhaps, twigs, now enlarged to trunks pulsating strongly,
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 blood-vascular tumours, they become enlarged and di-
minished in size, according to the sluggishness or activity of
the blood circulating through them. They are compressible,
elastic, and of a reddish hue. They are usually subcuta-
aneous, but, sometimes, submucous also. The most common
situations are beneath the integuments of the face, head,
neck, back, and buttocks. The tumour pulsates synchron-
ously with the heart, and may be considerably diminished
in size by pressure, but resumes its usual condition when
the latter is released. In one case, the seat of the tumour
was dull and rough, sometimes accompanied by a vibratory
thrust.

Ulceration is likely to occur in these tumours, and lead
either to great hemorrhage or their removal.

Erectile tumour may be treated in three different ways:

1. The tumour may be removed. This is always better
done than by the ligature than by the knife.

2. The tumour may be starved by diminishing the ar-
terie supply of the same, as in the case of true aneurism,
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 intro-
duction of corrosive sublimate, the injection of the arm, or
the application of warm 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.

Varix of the Arteries.—A tortuous and dilated condition
of the arteries frequently comes on in the smaller arteries,
and produces a painful tumour. It may be removed in the
same manner as varicose veins.

If a ligature is applied to the opening of an
artery for the purpose of drawing blood, as phlebotomy
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 phle-
botomy 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-letting, one of the superficial anterior branches of
the temporal artery is generally selected. In this position
the wound is easily healed afterwards by pressure. The ac-
idental wounding of an artery, as is sometimes the case in
bleeding from the arm, is likely to result. The fact that the
potash nitric acid 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 artery proximally.
Sometimes on removing the compress after arterio-
tomy, 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.

Bladders, Disease of.—The 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, a desire to urinate, and, at
times, pain in the urethra. The urine is rendered very
freely. This is due to the liberation of struvite, or phosphatite.
The passage of the urine is often a cloudy or brownish
mixture with blood. These local symptoms are accompanied
with general fever. The inflammation may extend from the
bladder to the peritoneum. The bladder becomes enlarged and di-
minated in size.

This disease may come on after the operations of
lithotomy or lithotripsy, or other direct injury. It may be
the result of specific inflammation of the urethra, extending
to the bladder, or it may come on from irritating medicines
acting on the bladder epithelium. In its treatment antiphlogistic remedies of an active kind
are needed, such as bleeding generally and locally, antimony,
calamint, and opium. Opium should be given by the mouth
and the three per cent. dose of opium by the nose. The
bowels should be opened by enema and general purgatives;
the recumbent position must be absolutely enjoined.

Cystitis may become chronic, or a chronic inflammation of
the bladder may be produced by irritation in neighbouring
organs, as in the urethra, rectum, or kidneys. There is pain
in the bladder, frequent micturition, and mucus in the urine.
The mucous membrane of the bladder may ulcerate, and then
the urine is mixed with blood and pus. The ulceration may extend through the bladder to the surrounding organs.

In the treatment of this disease, the obvious cause must be
removed. Opium for the pain, a generous diet, astringent
infusions, as of buchu, and mineral acids, are principally
recommended. Iron is sometimes of great use, also
sodium bicarbonate and distilled water. The hypogastrium, or over the
sacrum, should not be neglected. In very chronic cases it has
been recommended to wash out the bladder with warm
water by means of a double catheter. Lallemand recom-
mands the direct application of the nitrate of silver.

In the bladder the symptoms resemble those of cystitis. There is frequent
micturition, uneasiness in and about the region of the
bladder, and the patient feels disagreeable sensations in
the abdomen. The urine is mostly limpid and clear.

It depends on some derangement of the kidneys or general
health, or it may come on from stones, piles in the bladder,
or thread-worms.

In treating this state the great thing to be done is the removal of the cause of the disease. Where it comes on in a
generally decayed state of the health, the treatment must be
directed to this condition of the system.

Hematuria.—Blood in the urine may present itself when
the kidneys, bladder, or urethras are affected. When it arises
from the kidneys, it may be due to the presence of small tabular cysts, produced in the tubules of the kidneys.
When the bladder is the seat of stone, cystitis, or malignant:
tumours, bloody urine may make its appearance. When
the hemorrhage proceeds from the urethra, the urine is
away independent of the urine. In these cases the causes
of the hematuria must be treated.

Incontinence of Urine or Enuresis. This disease presents
itself in two classes of cases, in children, and in adults.
The former is always the result of disease or of some trouble
from the bladder, and produces a difficulty in emptying it.
The urine is usually passed voluntarily during the day, but in
the night it passes away involuntarily. Although frequently
acted as though it were a bad habit, it is the result of a
morbid state of the system, which must be removed, and
the will should only be called into exercise to assist a
judicious system of treatment. All causes of general debility
should be removed. Sea air, cold sea-bathing, with the
administration of iron, especially the tincture of the sesqui-
chloride, are the most appropriate remedies for the want
of tone of the nervous system which accompanies this
disease. Strychnia has been recommended. The child
should not lie on its back, and it should be awakened in the
night, at stated intervals, to pass the urine voluntarily.
Meat is also recommended.

In the incontinence of adults, either the urine passes away
from previous retention, or, as happens in aged people, the
bladder loses its tone, and both its expansive and retentive
powers decline. In the former case the abnormal urine
must be employed to empty the bladder, and the retention treated.
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 stimulants is 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.
This may be directed to the bladder, which is usually
distended above the pubes, there is dulness on percussion
there, and pressure produces great pain. Sickness is fre-
quently present, the pulse becomes rapid, the skin hot, and
at last symptoms of the absorption of toxins begin to
press upon themselves, and unless relived, the patient dies from
the blood becoming poisoned by the use of 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 cured by the removal of the cause.
The following are enumerated as causes of this disease;
Stricture of the urethra. Inflammation of the urethra.
Irritation and spasm of the neck of the bladder.
Calks in the bladder. Stones in the bladder or perineum.
Prostatic ulcer. Blood in the bladder. Malignant
disease of the bladder or urethra. Imperforate urethra. In each
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of these cases a special treatment is necessary, but in all
it should be remembered that fatal results will occur
unless the diseased viscous 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 bladde the operator is cautious not to
reach the intestines which are in immediate relation to the
pu!es; for this purpose, the abdomen in the region of the pubes
was resected to the exterior. [Lever.] When this operation is
undone, the bladder may be resected from the rectum and punctured
here. It is only when these two methods are found to be
impracticable that the operation is resorted to; and since the
abdomen in the region of the pubes is resorted to, the herniate
these operations are not often performed: "but any
one of them is much preferable to any time to postpone
of relief, and consequent disaster by extrava	ation; and
all, too, are preferable to pushing a metallic catheter
by sheer force through an impassably straitured 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.
It is a common fact that during the progress of this disease, and
is the result of inflammatory action, and the other is an enlarging
general independent of that process. The first is only
temporary, and may be frequently speedily removed by treatment.
It is the result of stricture, stasis, affection of the rectum
or irritation to the perineum, in the latter the
purifying, the recurrent position, and counterirritants, are
the proper treatment. The second form of enlarged prostate
is more difficult to manage. It is one of the conse-
sequences 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
diseased prostate. In the latter condition the bladder is
empty the bladder are more frequent, and the act is less
perfectly accomplished, and a portion of residuary urine
remains in the bladder behind the enlargement. Under
these circumstances the bladder becomes irritable, and chronic
constipation established. The sympotms 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 by the use of an emetic and
expectorant; the cold or hot fomentations; the act of
and exercises must be avoided. The recurrent position
must be maintained as much as possible. The bowels regul-
ated by enemata and gentle aperients. Opium, iron,
mineral acids, and bichloride of mercury, be given according to
circumstances of the case. In order to give the greatest
distinction the catheter must be had recourse to, and the water drawn off
occasionally.

Breast Diseases. The mammary gland, especially in
the female, is liable to various diseases, requiring the atten-
ion of the medical practitioner.

Irritable Mammary. In both married an married females
the breast is liable to irritation from sympathy with other
parts of the body. In these cases there is often great pain
and uneasiness in the breast, and the whole system suffers
more or less. There is no inflammation, and no swelling or
external alteration of the mammy. The pain is sometimes
intermittent or periodic, similar to neuralgia. When the
general health is affected this must be attended to. Opium
and bichloride of mercury, in order to give the greatest
distinction the catheter must be had recourse to, and the water drawn off
occasionally.

Mammitis. Inflammation, acute and chronic, of the sub-
stance of the mammy is not uncommon. It is generally
considered a cold or hot fomentation, or, 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 inedible, and the symptoms of inflammation with fomenta-
tions and poultices should be applied to the breast.
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 growths and general enlargement. The chronic
mammary tumour" of Sir Astley Cooper consists of a partial
hypertrophy of the gland. Enlargement of the whole gland
frequently takes place. These enlargements may be got
by pressure and treatment of the general health. The
mammary tumours may be simple, cystic, inflammatory, neoplastic,
malignant tumours. In many of these cases it becomes necessary
to remove the breast. This is done in the following manner:
"The patient having been placed recumbent, and duly
assisted, the arm on the affected side is raised and held
by an assistant, so as to stretch the pectoral muscles and
facilitate incision. The knife is entered in the axillary aspect
of the tumour in a line with the mammales, and is moved in a
semi-elliptical direction towards the opposite point; a similar
procedure 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 laxity of the
parts. It is a fault to take away an undue amount of sound
in the healthy part of the arm. The objective is to remove
and maintaining apposition of the wound; but it is a worse
error to leave taint 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 until the sound part of the arm is delivered. If the
knife is sloped through the subcutaneous part; and
regular dissection is proceeded with from the axilla down-
wards, dividing the principal vessels and nerves at once, and
avoiding the clavicle, the operation comparatively
bloodless and free from pain. The dissection, with
its border of comparatively sound tissue, in the case of
malignant tumour, having been removed, is carefully exa-
mined on every aspect by both sight and touch; and, if need
be, the arm amputated, which, when needful, is surely
apparent. The vessels having been secured, the
wound is brought together and treated in the ordinary
way."

Much has been recently said of the removal of malignant
tumours, especially of the breast, by means of excision.
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 local in their distribution, the patient and
they were not malignant. With regard to general treatmen,
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 Ame-
rican writer has recommended the use of general
and local treatment, which has been witnessed
and reported on in this country. The cases referred to were
referred to 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 paste with common
butter. This paste was applied directly to ulcerated cancers
and, when the skin was unbroken, nitric acid was first employed
in the form of an eschar. After this treatment, the
paste was inserted into the incisions on pieces of calico. This 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
heal by itself. The following passage concludes the report of the special
staff of the Middlesex Hospital on this mode of
treating malignant tumours:
"The last particular of this treatment is the practice of incisions; and we are of 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

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the practice of present surgeons. Cancer in its constitutional nature remains as ruthless and as insidious as ever.

Suzamnite. [Mineralogy, 8.1]

Sweden. In 1859, to date the population was given in the previous article, it amounted to 3,109,772. The following table shows the increase, and also the lands or provinces into which Sweden is divided —

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Square Miles</th>
<th>Population</th>
<th>December 31, 1865</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malmo</td>
<td>1,774</td>
<td>268,664</td>
<td></td>
</tr>
<tr>
<td>Vastergotland</td>
<td>274</td>
<td>190,121</td>
<td></td>
</tr>
<tr>
<td>Halmstad</td>
<td>1,829</td>
<td>110,815</td>
<td></td>
</tr>
<tr>
<td>Carlstron</td>
<td>1,120</td>
<td>113,239</td>
<td></td>
</tr>
<tr>
<td>Westro</td>
<td>3,771</td>
<td>145,707</td>
<td></td>
</tr>
<tr>
<td>Jönköping</td>
<td>4,374</td>
<td>164,162</td>
<td></td>
</tr>
<tr>
<td>Calmar</td>
<td>4,240</td>
<td>212,565</td>
<td></td>
</tr>
<tr>
<td>Linköping</td>
<td>4,360</td>
<td>230,610</td>
<td></td>
</tr>
<tr>
<td>Mariefred</td>
<td>3,301</td>
<td>200,235</td>
<td></td>
</tr>
<tr>
<td>Wernerborg</td>
<td>5,015</td>
<td>244,544</td>
<td></td>
</tr>
<tr>
<td>Göteborgs</td>
<td>1,863</td>
<td>155,792</td>
<td></td>
</tr>
<tr>
<td>Wisby</td>
<td>1,222</td>
<td>46,985</td>
<td></td>
</tr>
<tr>
<td>Stockholm</td>
<td>2,899</td>
<td>117,193</td>
<td></td>
</tr>
<tr>
<td>Uppland</td>
<td>2,059</td>
<td>90,826</td>
<td></td>
</tr>
<tr>
<td>Nyköping</td>
<td>2,630</td>
<td>98,241</td>
<td></td>
</tr>
<tr>
<td>Örebro</td>
<td>3,250</td>
<td>123,689</td>
<td></td>
</tr>
<tr>
<td>Karlsbad</td>
<td>6,916</td>
<td>322,221</td>
<td></td>
</tr>
<tr>
<td>Falun</td>
<td>12,259</td>
<td>188,755</td>
<td></td>
</tr>
<tr>
<td>Götene</td>
<td>7,528</td>
<td>126,268</td>
<td></td>
</tr>
<tr>
<td>Hernösöns</td>
<td>9,461</td>
<td>141,146</td>
<td></td>
</tr>
<tr>
<td>Östergötland</td>
<td>19,053</td>
<td>65,986</td>
<td></td>
</tr>
<tr>
<td>Umeå</td>
<td>29,258</td>
<td>79,515</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>32,093</td>
<td>60,108</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>165,833</td>
<td>3,543,648</td>
<td></td>
</tr>
</tbody>
</table>

This area, increased by 3548 square miles of water not included in the lands, and the population column by 97,952, the result of the increase of the inhabitants of Stockholm, the capital of the kingdom, gives the total area 169,381 square miles, and the total population 3,641,600.

Manufactures. — The industrial products of Sweden comprise vast quantities of linen, which is manufactured in almost every house, woollen-cloth and other stuffs, refined sugar, tobacco, paper, leather, glass, some calicoes 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 is in corn, salt, and manufactured goods, especially the linens of Wernerborg-Län, which are carried to the most remote parts of the country, is very considerable. This commerce is facilitated by the good roads and the 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 Trolhättan 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 atronines, whisky, bricks, and tiles. A railway has been commenced, of which a portion, from Örebro to Arboga, with a branch from Dylwa to Norns, was open in 1865. It is intended ultimately to connect the Wener 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 Atlantic, and they are also employed, especially in the Mediterranean, and on the coasts of South America and the Mediterranean. The mercantile navy at the end of 1855 numbered 3274 vessels (carrying together 126,226 lasts), exclusive of those carrying less than ten lasts; and 181 steamers. The total number of foreign (including Norwegian) ships that entered Swedish ports in 1855 amounted to 6733, carrying 206,900 lasts; the departures numbered 10,656 vessels, measuring 425,384 lasts. The imports were valued at 26,601,000 crowns; the exports at 83,998,000 crowns. The foreign trade was second to most countries in America and Europe. The chief imports are brought from the following countries, which are named in order of the values:—The Hanse Towns, Great Britain, Brazil, Norway, Russia, Denmark, United States, East Indies and Australia, Prussia, and the West Indies. The exchanges for Swedish exports are Great Britain, Denmark, the Hanse Towns, 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 to Stockholm goods from Finland in three-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 export are copper, cobalt, alum, tar, pitch, hemp, oil, paper, tree bark, tobacco and snuff, bricks, furs, some lines, linens, vessels, and some minor articles. The chief articles of import are sugar, coffee, salt, fish, hides, cotton, tobacco, and wool; vegetables, linens, cottons, wine and brandy, dyestuffs, raisins, almonds, pepper, cinnamon, arrack and rum, butter, bacon, tobacco, soap, tram-oil, ginger, lacquered ware, tea, tallow, potash, and oil.

Education.—Sweden has two universities, Uppsala and Lund. The national situation of the form is about 1000 students; at the latter, between 400 and 600. There are besides, 12 gymnasia for higher instruction, preparatory to the universities; 41 lardums skolas, or grammar schools, and 40 apologist schools, where the common branches are taught, with, in some instances, French, English, and German. The usual term of instruction, 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 the village schoolmasters. Schoolmasters are trained by government and paid by the communes in kind. In 1860 there were 2107 stationsary and 1381 ambulatory schoolmasters. Of the masters, 918 were clergymen and 690 church clerks. In that year, 143,526 children were receiving instruction in the stationary schools, 126,178 in ambulatory schools, 129,996 were instructed at home, 9238 in the secondary schools above named, and 17,468 in private schools, making a total of 429,988 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 1838 and 1837 at 14,556,300 crowns; and the expenditure for 1838 was 12,870,000 crowns; but in the budget proposed for 1838, 1839, and 1840, the receipts are set down at 25,427,600 crowns, and the expenditure at 24,817,000 crowns. These sums are for Sweden independent of Norway. The strength of the army is stated to be under MUNTFR AND NAVAL FORC S. S. 2. The present King, Oscar I, succeeded his father in March, 1844.


SWITZERLAND. There is no material alteration in Switzerland, but the following table gives 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>Representatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aargau</td>
<td>561</td>
<td>199,852</td>
<td>10</td>
</tr>
<tr>
<td>Appenzell</td>
<td>132</td>
<td>54,853</td>
<td>3</td>
</tr>
<tr>
<td>Basel</td>
<td>184</td>
<td>54,853</td>
<td>3</td>
</tr>
<tr>
<td>Bern</td>
<td>2,556</td>
<td>485,301</td>
<td>23</td>
</tr>
<tr>
<td>Freiburg</td>
<td>563</td>
<td>99,351</td>
<td>5</td>
</tr>
<tr>
<td>St. Gallen</td>
<td>728</td>
<td>146,351</td>
<td>7</td>
</tr>
<tr>
<td>Geneva</td>
<td>91</td>
<td>61,414</td>
<td>5</td>
</tr>
<tr>
<td>Glarus</td>
<td>279</td>
<td>30,213</td>
<td>2</td>
</tr>
<tr>
<td>Grisons</td>
<td>2,962</td>
<td>89,935</td>
<td>4</td>
</tr>
<tr>
<td>Luzern</td>
<td>586</td>
<td>121,713</td>
<td>7</td>
</tr>
<tr>
<td>Neuchâtel</td>
<td>220</td>
<td>76,743</td>
<td>2</td>
</tr>
<tr>
<td>Schaffhausen</td>
<td>115</td>
<td>35,360</td>
<td>2</td>
</tr>
<tr>
<td>Schwyz</td>
<td>348</td>
<td>41,594</td>
<td>2</td>
</tr>
<tr>
<td>Solothurn</td>
<td>254</td>
<td>69,674</td>
<td>5</td>
</tr>
<tr>
<td>Thurgau</td>
<td>268</td>
<td>88,908</td>
<td>4</td>
</tr>
<tr>
<td>Ticino</td>
<td>1,033</td>
<td>117,759</td>
<td>6</td>
</tr>
<tr>
<td>Unterwalden</td>
<td>262</td>
<td>22,182</td>
<td>2</td>
</tr>
</tbody>
</table>
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 post and responsibility in that profession. In 1832 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 ships of the Navy. Captain Symonds therefore 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 a size and form that he thought would be better adapted to the purposes and responsibility that he thought would be better adapted to the purposes and responsibility that 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 of no inconsiderable 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 1840, 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 had been Surveyor of the navy, and all upon the same principles of construction, but of a different form, and as originally adopted in the Pantaloon, 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 Aden and Red 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, 1836, and nominated a C.B. of the Civil division in 1846. In 1854 he was placed in the Royal Navy pension list. He died, March 30, 1856, on his voyage from Malta to Marseille.

(O'Byrne, Naval Biographical Dictionary; Fincham, History of Naval Architecture, etc.)

SYNAPSE. [Chemistry, S. B.]

SYNAPSE, a family of Echinoderata, 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 Chirodiscus, which has a cylindrical and vermiciform body, elongated tentacles, digestive at their extremities.

C. digitata has a vermiciform body, white with orange spots, the tentacles long, pedunculated, digitate. This animal was first found by its specific name, and its habits are very rare. Professor Forbes, in his 'History of British Star-Fishes,' says that he never had seen a living specimen.

SYNAPTASE. [Chemistry, S. B.]

SYNAPONIDAE, 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 descriptions:

Synapontidae, Pipe-Fishes. Body prolonged, slender, linear, or angular; mouth greatly prolonged, cylindrical; mouth terminal, vertical. Ventral fins absent; caudal fin wanting in some.

Hippocampidae, Sea-Horses. - Head and body compressed; snout narrow; mouth terminal. Pectorals small; dorsal single; caudal fin wanting.

Pegasidae, 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 Lophobranchia), 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:

Synapontus 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...
merapai, and include the British species *S. Aenus* and *S. Aenus*.

*S. Aenus*, the Great Pipe-Fish, is one of the most common forms of the genus. It is found on many parts of the coast, sometimes at low water amongst sea-weed; at other times in deep water. The most curious feature in the economy of this fish is the fact that the roe is transferred from the belly of the female to the pouch of the male.

*S. Typhon* (Linnaeus), the Deep-Nosed Pipe-Fish, Lesser Pipe-Fish, or Shorter Pipe-Fish; *Aenus Aristolotus* and *Typhon antiquorum* of Wullingham. This fish is distinguished from the last by the more compressed form of the jaws. From the British species it is distinguished by the possession on the part of the male of a pouch for the reception of the ova. The habits of this fish resemble those of the last.

*S. anguineus*, the Snake Pipe-Fish. Although this and the preceding species possess no subcaudal pouch, the ova after expulsion from the female are carried by the male in separate hemispherical depressions on the external surface of the abdomen.

*S. ophidion*, the Straight-Nosed Pipe-Fish, is known by its straight jaws about nine inches in length.

*S. lumbriciformis*, the Worm Pipe-Fish, is the smallest of the British species. It has been taken on various parts of the coast. It does not exceed five inches in length. The young of this species have been observed to undergo a curious change in their appearance; their body is covered with a fin-like membrane, and it also possesses

pectoral fins. During their growth the caudal membrane and pectoral fins are 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 tubercular points at the base of the teeth; both sexes have saccate and dorsal fins; the females only have an anal fin; neither has ventral or caudal fins.

**H. brevirostris**, the Sea-Horse, or Short-Nosed Hippocampus, is occasionally met with on our 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 remains in that position for many minutes, and darts at its 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 snout as in the previous genus, but the mouth is under it, and movable. Two distinct vertical fins behind the pectoral, which are often large, hence the name of *Pegasus*, or Flying Horse. The species are found in Indian Seas.

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**SYNODUS. [SOPHOPD.]**

**SYRINGINE. [CHEMISTRY, S. 2.]**

**SYRINX. [SPHINCUSCULDES, S. 2.]**

**SYSTEM, SEXUAL. [SEXUAL SYSTEM, S. 2.]**

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**TAHITI. [OAHETKE.]**

**TALFORD, SIR THOMAS NOON, Knt.,** was born January 26, 1756, at Doxey, 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 Talford 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 study in London. Oliphant, the publisher, in 1817 commenced practice as a special pleader on his own account. During many years of the earlier part of his residence in London his income was derived chiefly from his literary labours, as a contributor to the 'London Magazine,' the 'New Monthly Magazine,' and other periodicals. 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 Rust, 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 of the dignity of Queen's counsel was deferred till his patience was exhausted, and he therefore, in Hilary Term, 1833, assumed the cotf, and became Mr. Serjeant Talford. He was also for some years Recorder of Banbury. At the general election in 1835 Mr. Serjeant Talford was returned to parliament as one of the members for the borough of Reading, Mr. Fysh Palmer, the previous liberal member, having retired. In 1837 Mr. Talford again came forward, and was returned with Mr. Talford. At the next election two conservatives were returned, and Mr. Talford was out of parliament from 1841 to 1847, when he was again returned for Reading, and retained his seat till July 1848, when he was appointed successor to Mr. Justice Coltman in the Court of Common Pleas, on which occasion he also received the honour of knighthood. As a member of the legislature Mr. Serjeant Talford may be said to have added two valuable enactments to the statutes of the realm—the Custody of Infants Act (2 & 3 Vict., c. 64), and the Corrupt Right Act, which he first introduced in 1837, but which was strongly opposed, and was not passed into a law till 1842 (3 Vict., 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. Talford 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 'London Journal, the 'New Quarterly Review,' the 'Retrospective Review,' the 'Edinburgh Review,' the 'Quarterly Review,' and the 'Law Magazine,' to which last he was furnished in January, 1846, an able article on 'The Principle of Advocacy in the Practice of the Bar.' In 1835, he printed for private circulation two editions of his tragedy of 'Ion.' On the 20th of May, 1836, the tragedy was acted for the benefit of his friend Mr. Maconley, at Covent Garden Theatre, and at the same time was published. It was afterwards acted with success at the Haymarket Theatre, and elsewhere. The tragedy of the Greek dramatists were occasionally performed by the scholars at Dr. Valpy's school in Reading, and there Mr. Talford acquired his taste for dramatic literature. The first two privately printed editions of 'Ion,' dedicated to his venerable master, who, however, died before it was acted, and then a 'Notice of the late Dr. Valpy,' were prefixed instead of Dedication to the first published Edition of 'Ion.' The title is borrowed from the 'Ion' of Euripides, which also suggests the object of the foundling youth educated in a temple, and assisting in its services, but nothing more. His next tragedy, 'The Athenian Captive,' was published in 1838, and was performed in the same year at the Haymarket Theatre, and with moderate success. This tragedy was succeeded by that of 'Glencoe, or the Fate of the Macdonalds,' first represented at the Haymarket, May 23, 1840, 'The Castilian,' an Historical Tragedy, in Five Acts, was published in 1853, and one of these tragedies does not display much of what may be properly called dramatic skill, nor does he exult that kind or degree of interest which arises from distinctness and discrimination of character.
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 fit for English stage. The trunk was large, but all the individuals use indiscriminately the same elaborate form of expression, and the meaning is not unmeaningfully rendered obscure by the redundancy of the diction.

In 1837 Mr. Talbourn published the 'Letters of Charles Lamb, Extracts of his writings', 4to, 2 vols. 8vo, a domestic tragedy of the most affecting interest, which had been long known to a few friends, but was not still then brought within the reach of the public. On the 20th of June, 1844, he was a created a Doctor of Civil Law by the University of Oxford. In 1845 he published 'Vacation Rambles and Thoughts, comprising the Recollections of Three Continental Tours through France to Italy, and Homeward by Switzerland, in the Vacation of 1846', fasc 8vo. The journeys were all rapidly made, and the information which the volumes con- tain 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 an extraordinary facility of expression to be very effective. His reputation is that of a sound lawyer for deciding 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 a liberal and social in an eminent degree, and he had a large circle of friends, chiefly literary and legal.

The death of Mr. Justice Talbourn occurred on the 15th of March, 1854. He had opened the session at Stafford on Saturday the 19th, and in the evening, 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 in a few minutes he indi- catedly bore out of court to 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 1855 the members of the Oxford Circuit placed a bust of him, sculptured by Lough, in the Crown Court at Stafford. It is an excellent likeness.

TALLOW, for TALLAGH [WATERFORD].

TAFF, [COMITATIS. S. 2.]

TANGHINE. [CHEMISTRY. S. 2.]

TAPE-WORMS. [ENTOZO; PHYSCI, PRACTICE OF (WORMS). S. 2.]

TAPIOLÉ. [ARNÉDEL. S. 2.]

TARGAY. [LÉGUMES.]

TARRAGON. [ANGUALE]

TARTARIC ACID. [CHEMISTRY. S. 2.]

TAXEY, JOHN CHARLES, was born of English parents at Dieppe, Normandy, 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 (Messieurs Carpes, ingénieur en chef des ponts et chaussées du Département de la Seine Inférieure), and when his family, through the interest of friends, had the means of escape given them, he was left behind in France until an oppor- tunity should offer to send him to England. This never occurred. But M. Féral, faithful to his trust, brought the child up as his own son, educated him partly himself and partly at the government school at Pont-Audemer, and at the age of 18 was apprenticed to be superintend- ing the government works he was superintending under the government. In the year 1808 M. Féral 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 Brest, and then as assistant to the Minister at Dieppe, Spozia, 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. As such he continued to be in the French state of affairs, and his own desire to return to his family being very strong, Mr. Tarver gave up 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 Macaeleigh in Hampshire, where he continued to live till 1826, when he was appointed French master to Etos school, which situation he held till his death April 15th, 1851, aged sixty-one.

Besides having written several elementary works, now used at Etos and other schools, he published while at Macaeleigh a 'Dictionary of French Verbs, showing their Government and Peculiarities.' During his resi- dence at Windsor he wrote his translation of the 'Inferno' of Dante in 4to; and subsequently 'Lectures on French History,' 'Paris, Ancient and Modern,' and some minor works. He also revised the grammars of Wannstedt and Liezice, 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 them- selves in phrasological studies. TASMANIA. A full description of this colony, formerly more generally known as Van Diemen's Land, will be found in vol. xxxiv. The following gives the material alterations that have taken place.

December 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 prevent the immigration of people to Tasmania. On Dec. 31, 1855, 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 continu- ally expanding. The efforts of the local government are rapidly extending improvements over 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 5,514,756lbs. of wool (the average quantity for four years, 1849-52, had been upwards of 5,000,000 lbs.); 3996 hides (the average number for the previous four years had been about 500,000); 776 cwt. tallow; 42,000 cwt. of mutton and pork; 400 tons spermaceti, and 440 tons spermaceti oil. The declared value of the imports of British produce and manufactures from Great Britain in 1853 was 1,408,927l., the average for the preceding four years being only about 420,000l. Of foreign and colonial produce, chiefly spirit, wine, 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, 1854, was, Hobart Town, 519; Launceston, 214; and Port Philip, 402 tons aggregate. Of steam-vessels, 6, of 510 tons aggregate burden, were entered at Hobart Town, and 2 of 336 tons at Launceston. In 1854 the value of the imports was 2,604,680l., of which 1,516,604l. was of British produce; the exports amounted to 1,435,021l., 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 35,320 of oats; while the sheep numbered 1,631,306, the cattle 64,000, and the horses 13,200. The value of land was 22,258. The land revenue had amounted to 112,225l.

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 the government buildings are handsome. Some improvements have been made of late years, particu- larly 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 river which runs through the town, affords a supply of fresh-water. The
population on December 31st, 1847, was 21,467, of whom 3569 were foreign born.

Launcestown, the second town of the colony, is situated at the confluence of the North Esk and South Esk, which there form the Tamar, 45 miles from its outfall in Bass's Strait. It is 124 miles N. by W. from Hobart Town. Launcestown contains a hospital, a 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 Launcestown, and 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 6300. Launceston, on the Tamar River, 20 miles from Hobart Town, is a small town in the rural deanery of Longford, with a population of 968.

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-General in Council, 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.

Launcestown was appointed in 1842, whose diocese includes the whole island and its dependencies, 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 of the Church of England, 9 of Roman Catholics, 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. The schools, under Government control, are taught by government-paid and appointed pastors, and which it may be noticed is in a remarkably ugly part of the country. It is in particular destitute of trees. "King Olof, the tree-feller, a nasi well known in Swedish history, took his pleasure there; it has been remarked, "with axe and fire, and the trees have not grown again for a thousand years." In February, 1792, when Esais was in his tenth year, his father died, leaving a widow and six children, four sons and two daughters. His mother cast herself into the arms of a parish-priest, who was a remarkable character. She was highly respected for diligence and piety. His wife, whose maiden name was Seidellin, was noted for her courage and her talents, which she sometimes exercised in writing verses. The poet grew up till his tenth year at a school, and was a remarkable boy, a remarkable poet, and an appointed pastor, and which it may be noticed is in a remarkably ugly part of the country. It is in particular destitute of trees. "King Olof, the tree-feller, a nasi well known in Swedish history, took his pleasure there; it has been remarked, "with axe and fire, and the trees have not grown again for a thousand years." In February, 1792, when Esais was in his tenth year, his father died, leaving a widow and six children, four sons and two daughters. His mother cast herself into the arms of a parish-priest, who was a remarkable character. She was highly respected for diligence and piety. His wife, whose maiden name was Seidellin, was noted for her courage and her talents, which she sometimes exercised in writing verses. The poet grew up till his tenth year at a school, and was a remarkable boy, a remarkable poet, and
and aptitude for learning, was smitten with the thought that he was degrading him 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, the boy, then aged thirteen, who had just been reading Bastholm'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 a tax-collecting 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 Essaias from study, and to propose that he should take him as a secretary, and be under the instructions of his elder brother. Löwenjelm at once consented, 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, spares time instead of wasting it.' He stated that he began French and English at the same time—French in Torneträsk and English in Stockholm—and that he had received him: a letter written by him in 1793, which was afterwards found, showed that at the age of ten he was already studying Latin and French at Milleröd. Ossian's Poems, he continued, he read for about a year English without any assistance. A door is still shown at Malma, the residence of Captain Löwenjelm, which bears the marks of the iron rod with which Tegnér used to thrust at it; when enthusiastically shouting out in English one of his verses, as if he were regarded so 'The spirit of Connal is keen!' In the next year the services of Lars were transferred to the family of Christopher Myrman, an iron-master at Nären, near Filipstad, who made some of the best iron in Sweden, and was a man of learning as well as a man of business. At least, he bore a stipulation that his 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 eldest four sons; and his brother was in charge of three of the others, and the lover of one of the daughters, whom he married some years later.

At Råmen 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 ripper age the theme to appreciate it fully, and I was not yet acquainted with Homer. According to his own recollections afterwards, he in seven months after commencing the study of Greek, had read the 'Iliad' three times through and the 'Odyssey' twice, and was able to make out the sense of Ovid and 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 in life.' He made himself at the same time a 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, that he was recommended to become a candidate for a degree. His wish of means became however 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 Amacon which he wrote in classical Latin, led Professor Norberg to advise him and 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, but the business of the family seemed to him a burden for learning, he became remarkable for the awkwardness, reserve, and rusticity of his manners. A post as under librarian, and afterwards that of assistant-teacher of mathematics, he accepted; and finally, in 1806, he was enabled to marry, and Anna Myrman became his partner for life. Then a change took place, which was extraordinary, strange, and sudden. Immediately after his marriage he became all at once as fond of company as he had been oneself to it, lively, open, and full of spirits to an extreme, which seems on many occasions to have led him to objectionable levity. The wit of the Greek professor at Lund was often censured as passing the bounds of decorum. This professorship was confided on him almost by right, when, in 1812, a separate professorship of Greek was first established at Lund. Together with the professorship he received the living of Staffe, which obliged him to take holy orders, and for the next twelve years of his life he lived in the deanery of Staffe, dealing with the Latin 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 living poet of Sweden and its rising bard.

His first public appearance in verse, which attracted 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, from which it 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 Scanian Land-Defenders,' 'Local Militia.' This warlike dithyrambic," says Böttiger. 'would never have been heard from the Swedish lyre. The electric lines ran like wildfire through the kingdom, bearing testimony that the poet had sung in the same degree as his ancestors sung in Sparta.' In 1811 another patriotic poem entitled 'Frigio,' 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 swords naturally belong to the anti-classical party, excited some surprise by his undertaking the defence of Leonidas, which he afterwards followed up by dedicating to him his poem of 'Axel.' His consecration as a priest in 1812 gave occasion to a poem on that subject, which was afterwards surpassed by a poem of the same kind, his 'Nattvarslarbornen,' or children of the Lord's Saver, a sort of religious idyl, in 1820. In the same year, 1820, some cantos of his 'Frichtio Saga,' a romantic tale of ancient Scandinavian, appeared in the 'Iduna,' a periodical published by the Gothic Society, of which Geijer [Geijer, S. 2] was the leading spirit, and which was well acquainted in the country before either of them emerged into fame. His reputation was enhanced in 1821 by the publication of 'Axel,' a brief poetic romance, still thought by many the fairest of all his works. The point in 1825, by the completion of 'Frichtio Saga,' which became at once the most popular poem that ever appeared in Sweden. From the period of the publication of 'Axel,' if not before, the name of Tegnér 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 Vymo had presented his name to the king as candidate of the three whose fate it was to fill the bishopric, 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 professor was confided on a bishopric whose priest would now be turned into a very indifferent bishop. These expectations were disappointed. From the time of Tegnér's appointment his life took a different course. He ceased to appear as a poet, and gave himself up to the duties of his office. It brought him the personal loss of a large part of its revenues, in which his early experience with Branting was said to be found of use. Almost the only unepiscopal episode we hear of for some years is on that memorable day in 1829 when he met with Dr. Böckh [Boekh, S. 2] and von Schleicher [Oelenschlager, S. 2]. He gave himself up to theological studies, and was found in his study "walled up with fathers of the church and biblical commentators." Thirty-one new churches were built in his diocese during
his episcopate. At the dioceses which he attended he was distinguished for his conservative principles and his opposition to what he called 'Radicalism,' at the time when his old friend, Mr. Wilberforce, was so actively engaged 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 1831, financial affairs were again convoked to a friend of his being bilious and unwell, so unwell, he said, that he was as little able to comprehend financial affairs as a member of the Bank committee. "As for biliousness," he added, "it is unnecessary to carry that which is a peculiarity of constitution in the body, and in life to belong to the order of the day." Tegnér was still looked upon with such favour 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. "God preserve my understanding," he said, 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 seclusion of some months in an institution for the insane at Schlisselburg enabled him to return in 1841 to his family, and partially to his duties, and the he was even able to preach so lately as June, 1846, and at的形象 passed on, and left behind chills his house and his room. He lay on the sofa, in cheerful spirits, and passed his time in reading. "About him," says Böttiger, "was generally seen a pile of books of different authors, from the old school to the new; a fashionable novel, but some volumes of Arlöst and Walter 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. He was survived him, and he left six children, one of whom, a daughter, is married to Professor Böttiger of Upsal. Böttiger is himself a poet, and one of his best-known poems is "A little induced to enter the Bay of Naples, where having been interested by witnessing the emotions which a stranger evoked 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 'Frithiofs Saga.' Tegnér, as we have seen, had lost his father in 1792; 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 met Tegnér's mother, living in a village he was passing through. She told him that her son had told her that 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 anxiously tending on another son, who died. The son, who had been unguardedly walked into a river and was drowned. The works of Tegnér were collected and published in eight volumes by his son-in-law Professor Böttiger (Stockholm, 1847-50). 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 Seas;' 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 extremely limited; his conduct for Germans and Germans is repeatedly expressed, and it would be difficult to find in his writings praise of any country but his own, which, except for a tour for health to Carlabad in 1833, was the only one he had seen, or apparently ever wished to see. In one of his letters he even in derision of Stockholm as that hateful object a "large small town." His speeches are in great reputation both in Sweden and Germany for their lucidity and eloquence. They were chiefly delivered in the University-schools and on similar occasions, and are of much the same character as those delivered in England and America at mechanics 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,' 'Axel,' and the 'Children of the Lord's Sapper,' the English reader will find 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 of any other foreign poet of this century, and several of them are good. The first, by the Rev. William Strong, published in 1835, is undoubtedly the worst, but is still the work of a man of learning, and an enthusiastic for his original; an admirable version of 'Axel' is that of Charles G. Stephens, now Professor of English at the University of Copenhagen, was issued 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 'Frithiofs Saga' has been considerably overrated. The same conviction has been arrived at by several English readers, among others the critic of 'The Athenaeum'. In 1836, the English version 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 tamed nonsense, and its language is not up to the level of the original, and follows too closely the original saga, is that of a young Northern warrior who is enamoured of the sister of two young kings, who is denied her hand by her brothers, who, in his indignant proceedings thereupon, accidentally burns the sacred grove of Balder, and in a sort of humbly expiated the sacrilege against Balder of which he has been guilty. 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 as 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 'Axel' is in what may be called the Byronic metre, and in tone and structure strongly reminds the reader of Byron's 'Mazepe,' or it was doubtless modelled. The story is slight and commonplace—a maiden who follows her lover to the war in man attire, and whose unhappy husband combats her lover distracted—but the spirit with which it is told atones for every deficiency. Those who are fond of 'Mazepe' 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 rendered various passages from 'Frithiof' and 'Axel.'

TEID.E, a family of Saurian Reptiles. [Saurians]. The following is a synopsis of the genera:—

A. Ventral shields small, long, smooth. Tongue contractile.

1. Teius.—Toes 5-5. Femoral pores distinct. Two species.

2. Calodactylus.—Femoral pores none. Toes 5-5. One species.

B. Ventral shields broad, smooth.

Tongue elongate, sheathed at the base. Teeth compressed.


** Tongue not sheathed, free at the base.

5. *Diceros.*—Teeth compressed transversely, bифil.
7. *Acanthophya.*—Scales of back large, of sides granular.
10. *Crocodilus.*—Scales of back equal, similar. One species.

This family is well-illustrated by the *Teine Teguexis* of the British Museum Catalogue. It is the *Lacerta Teguexis*, Linn.; *Variegata Lizard*, Shaw; *Great American Safeguard*, Griffith's Cuvier.

The warm countries of America are the native places of the family. In some of that continent they are no less remarkable for being as much as $4$ or $5$ feet in length. Messrs. Duméréil 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 plung into it, 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. Duméréil 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 egges. He also relates that they are fond of honey; and that in order to procure it without fear of the bees, they come forward at intervals to the honeycomb, give the hive a blow with their tail, till by repeated attacks they weary out the industrious insects, and drive them from their home. For figure of the Variegated Lizard, see plate 2.

**TENANT AND LANDLORD.**

The provisions of the statutes 4 Geo. II., c. 28, and 11 Geo. II., c. 19, and 57 Geo. III., c. 62, 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. [Erratum, 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, provided 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.**

**TENNYSON WILLIAM,** was born in 1785 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, where he obtained a knowledge of a taste for the classical languages from the instruction and lectures of Dr. Hill and Dr. Hunter, but circumstances prevented his continuation for more than two sessions. At an early period he showed a tendency to his feet, and could only move by the assistance of 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-factor at Glasgow, whence he subsequently removed to Anstruther. Whilst in this situation he most zealously prosecuted his studies. He made himself acquainted with the best classics in verse and prose; with Ariosto, Camoens, and Wieland, in modern languages; and with Hebrew nearly all of which was accomplished by his own unaided efforts. His wife, a lady of strong intellect and deeply religious character, was extremely nut and painfully aware of approaching commercial embarrassments, he wrote, and published anonymously in 1812, in his own little town his chief poem, 'Anster Fair.' It is a luminous and humorous tale, adopting Maggie Laugher for its heroine, describing in a simple manner the manners, customs, and vanities of the inhabitants of Anstruther and Fair. It is a pleasant and instructive picture of the social state in the country, and it was published shortly after the death of Lord Byron, whose example was quickly followed by others.

The poem made but little way with the public at first, indeed it was hardly made known; but it attracted the attention and praise of J. F. Tytler, Lord Woodhouselee, and in 1814 a highly favourable review of it appeared in the Edinburgh Review. From the pen of Mr. Jeffrey. In his own narrow circle, however, it had made an impression in his favour, and probably assisted in procuring him the appointment in the autumn of 1813, of parish schoolmaster of Dumino, a rural upland district between Anstruther and St. Andrews, of which the income was about 40L a year. While residing here, with the assistance of books from the library of the neighbouring university, he made himself acquainted with the masters of the modern languages, and the poets of ancient and modern languages. In 1816 he was removed to a school at Lasawade, a pleasant village near Edinburgh, with a larger salary, affording him an easy opportunity of becoming known to the most eminent literary men of that country. He was elected a seat in the General Assembly of the Presbyterians in 1817, and in 1819 was elected teacher of the classical and oriental languages in the institution founded under the will of Mr. M'Nab for promoting education at Dollar in Clackmannan-shire. Here he continued till the beginning of 1833, when he succeeded the Rev. Andrew Grant as teacher of Oriental languages at St. Mary's College, St. Andrews. At St. Andrews, where the university session extends from early in November to the end of May, he henceforward passed his winters, while the summers were spent at a little villa called Devon Grove, near Dollar. His leisure was employed in compiling grammars of the Syriac and Chaldean languages, published in 1840. His other works were—

'The Thanes of Fife,' 1822; 'Cardinal Beaton,' a tragedy, 1833, and 'John Balliol,' a drama, 1822, both the prose, though not ranking high as dramas, displaying much poetical power, with considerable originality; 'The Dying Down of the Cathedral,' [of St. Andrews], a descriptive poem in the Scottish dialect; 'Hebrew Drama, founded on Bible History,' 1849; 'Reminiscences of Israel,' prefixed to an edition of the 'Gentle Shepherd,' not published till 1852 at New York. Another little production deserves to be mentioned, as showing the cheerfulness of mind and the goodness of his humour, 'The Anster Concert,' a small pamphlet of 12 pages, published at Cupar, in Jan. 1811, purports to be by W. Crookley, and preceded by some months the publication of his 'Anster Fair.' It is in the Scottish dialect, with motives on the title-page in Hebrew, Greek, Latin, and English, and pleasantly alludes to the peculiarities of the inhabitants of Anstruther, as well as to his own condition. He also wrote some miscellaneous poems, including translations from the Persian, Greek, and German, of which an average merit is indicated by the fact that it was published in the 16th of February, 1848, at his house near Dollar.

**TERBIUM. [CHEMISTRY, S. 1.]**

**TEROFIUM. [CHEMISTRY, S. 2.]**

**TERICOLLA. [ANNEZLDA.]**

**TESTUDINARIA, a genus of Dicotyledonous Plants, belonging to the natural order Diocococcae.**

* T. Elephas. The Elephant's-Foot Plant, is well known in our collections of plants from its curious truncate rootstock, looking like the upper end of a trunk with a soft corky bark, which is split so as to give it a rough character. From the top of this thick mass a climbing stem is sent, which bears the leaves and flowers. Like perennials, the top of the rootstock dies down, and the regeneration of the plant is seen in most Exocogonous Plants.

**TETRAONYX. [TORTOISES.]**

**TEXAS,** one of the United States of North America, lies between 26° and 30° 30' N. lat., 93° 30' and 106° W. long. It is bounded by the state of Louisiana; N.B. by that
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of Arkansas; N by the Indian Territory, W by the Territory of New Mexico, S.W. by the Republic of Mexico; and S 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 1860 was 212,592 (of whom 58,101 were slaves), or 2.84 per square mile. This, 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.

Surface, Hydrography, &c.—The surface of so vast a country is not very regularly varied, but it may be broadly 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, Eastern, Middle, and Western Texas.

The level region occupies the entire coast, and reaches 60 or 80 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 straitens out into a plain with a nearly level 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 trade, therefore, ascends the rivers to the distance of 45 or 50 miles from the sea in 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 forest consists of different kinds of oak, hickory, 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 grows in parts of the country, on the borders of the tropics; the sugar-cane flourish 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 during months. This is the most productive portion of the state. The country between the river-bottoms generally rises from them with a gentle acclivity to an elevation of 200 to 400 feet, and presents for the most part an undulating surface. The isolated masses of moderate elevation are dispersed. By far the greatest part of this tract is destitute of trees, which occur only in isolated clumps about 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 Sacramento, 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 Cunanches, to the wild animals, and to the hunter. Many of the mountains are believed 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 whether the waters have a return to the sea when the 'water-power' is fairly turned to account.

Texas owes much of its great capacity for agricultural purposes to its numerous rivers and the regularity of their course. Nearly all the rivers, even those which run only 50 miles, are navigable. Many of the rivers do not include their course. The most remarkable of these rivers from west to east are—the Rio Grande, noticed under Mexico, between which country and Texas it forms the boundary; the Rio Parra, observed along about the south-eastern course; the San Antonio; the Rio Guadalupe, which falls into a lagune forming the harbour of Espiritu Santo; the Colorado, or Red River of Texas, which enters in its upper course the mountain tract of San Sabo, at the head of a lake, and descends into a lagune constituting the harbour of Matagorda; the Rio Brazos or Brazos de Dios, whose origin is near to that of the Red River, and which, flowing chiefly in a south-south-east direction, nearly reaches the centre of Texas, and enters the most fertile districts, and turns towards a course of about 400 miles, and the Rio Trinidad, which, after a course of more than 300 miles in a south-south-east direction through a very fertile tract, falls into Galveston Bay. Red River and Sabine River, which 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, by keel-boats. Before reaching the gulf it expands into a lake 40 miles in length and 12 in breadth. 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 flat islands, separated by narrow channels from the sea. These are deeper than those farther south, and afford in several places good anchorage 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 begun. The roads for ordinary travel are many of them well laid out, and in good condition.

Geology, Mineralogy, &c.—The geological features of Texas are very diversified. The lower part of the country consists chiefly of igneous and metamorphic rocks. In the eastern portion of this district a considerable belt of Lower Silurian strata has been observed. North of this along the Sabine River, carboniferous strata occur. Much of the centre and north of the state is occupied by a 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 found in several of 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 diffused. 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 lagunes; large quantities are found on a salt lake near the Rio Grande. Potash and soda are also obtained in dry seasons near the salt lagunes. Asphaltum is obtained on the coast. From the limestone of the prairie country abundance of lime is produced, and the soil of the eastern part of the state, may be quarried through a large portion of the state. The white stone, which becomes quite hard on exposure to the atmosphere, and is very useful for building purposes, is found in several places along the eastern side of the hill country. Agate, chalcedony, and jasper, are abundant. Saline, white and blue sulphur, and other mineral springs, said to possess considerable curative properties, are very numerous.

Climate, Productions, &c.—The temperature 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 is short and cool, and refreshing. Snow is rare, and is completely unbroken from the south. In winter, ice is seldom seen, except in the northern part of the state. Texas has periodic winds: from March to November they are from the south, and little rain falls; the rest of the year northerly winds prevail, 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, as a staple crop, has gained a great growth; it generally grows well and of good quality; that growing along the coast is said to be little inferior to the celebrated Georgians Sea Island cotton. Tobacco also thrives well, and is becoming an important product of the state. The sugar-cane is extensively cultivated; and the manioc, or cassava, has attracted the notice of the Texan farmer. All the cereals produce abundant crops. Rape is the chief grain staple: two
Austin City, the capital, is situated on the left bank of the Rio Colorado, in 30° 28' N. lat., 97° 45' W. long.; 1 population 2309. It is merely a village, but it contains the state buildings, and supports two weekly newspapers.

Galveston, a city and port of entry, and the capital of Galveston county, is situated near the east end of Galveston island, about 200 miles S.E. from Austin City; population, 4177. The harbour of Galveston is the best in Texas, and six-sevenths of the state's produce and about 20 per cent of 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 has a good harbour, and about two miles wide. It was once a favorite lurking place for pirates, but is now thoroughly cultivated, and the residence of several wealthy farmers. During summer it is much resorted to by visitors.

Houston stands at the head of steam-navigation on Buffalo bayou, 160 miles S.E. from Austin City; 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 public buildings, churches, and schools. A wharf 500 feet long, with a cotton press at each end, extends along the front of the city.

San Antonio, near the sources of the river of the same name, 75 miles S.E. by S. from Austin City, population 3448, is the chief city of the Texas Spanish settlements in South Texas. 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 military post. Population, 6300.

History, Government, &c.—Until 1836 Texas 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 against the Mexican government. The hostility 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 San Jacinto by the Texans, under the command of General Houston. Santa Anna was made a 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 the terms were taken to Mexico effecting a re-conquest of Texas; and in 1845 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 disorganised. The Mexican army was defeated and the minister of war was assassinated. The Mexican government was unable to suppress the rising; and, after suffering a series of humiliating defeats, was constrained to accept peace on terms of acknowledging the independence of Texas, and ceding to the United States a large portion of territory, including the Rio Grande valley.

The constitution was adopted in August, and ratified in October, 1846. 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 45 nor more than 90 (at present 66) members, who are elected for two years. The governor is elected for two years. The state is divided into 25 counties. The revenue for the year ending October 1857, was $1,544,094 dollars, and the expenditure the same. The state militia is composed of about 15,000 men and 1248 commissioned officers. In 1860 there were in the state two colleges, having 800 students, and 2494 public schools, having 360 teachers and 7946 scholars. (Gazetteers of the United States; Official Reports relating to Texas, &c.; Seventh Census of the United States; American Almanac, 1847, Baltimore, &c.)

THALARGOS. [Bear.]

THALLOGENS, a class of Plants proposed by Lindley for those Flowerless Plants which are distinguished by the absence of an axial stem. It includes all the Cryptophytes, with the exceptions of the Cercopita and catenulatae.

THEIN. [CHEMISTRY, 8. 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

The text is a historical account of Texas, mentioning its major cities, their populations, and the events leading up to the country's admission into the United States. It provides details about the state's constitution, legislature, and education system.
A pupil of Vauquelin. 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 unceasing activity and his 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 1825 he was a member of the Legations and in the same year he was elevated to the dignity of a peer of France. 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 Thenard was one of the most original chemists of the first half 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 physiques et 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. Thenard commenced the publication of his 'Traité de Chimie élémentaire, théorique et pratique.' This work was intended to be an 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 1836. The great contributions of Thenard to the science are to be found in the scientific journals and transactions of scientific societies 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 shown considerable talent. He died in the month of June 1857, and was buried publicly in Paris on the 23rd of that month. For many years before his death Baron Thenard had withdrawn from all active chemical science, but he had never lost his deep interest in the development of the educational 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 Curvier to the development of the scientific institutions of France.

Therapeutics. Under this head it is proposed to give a complete list of one of the most important compounds that have been tried as an insensitizing drug, to the list of the 'Materia Medica' since the publication of the first Supplement to the 'Penny Cyclopedia.'

Anesthesia or Anaesthesia, the name of a genus of plants being mentioned in the medical order, Nymphalida, of which the plant yielding the Cocculus Indicus of commerce is now referred. It has the following characters: flowers diocious, calyx of 6 sepals in a double series with 2-closed pressed bracteoles, corolla none, stamens on separate flowers united into a central column, stellate at the apex: anthers numerous, covering the whole globose apex of the column. The flowers with pistils are not known, but the fruit is a 1- to 6-seeded drupe. The seed is globose, deeply excavated at the middle, oily, cotyledons imbricated.

The plant which yields the berries of commerce 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.

Anaesthesia, is the term applied to those agents, which, on 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 it both in quantity and quality, thereby impairing the power of communicating and perceiving impressions made upon its surface.

The state of anesthesia comes on in various forms of para-alytic disease, and as such has been known and described by medical writers. Anaesthesia can also be produced by artificial means, such as by some state of excitement brought on by what is called animal magnetism. In this state of the system the anesthesia is sometimes so perfect that surgical operations have been performed on persons whilst in perfectly unconsciousness. This was known previously to the general introduction of anesthetic agents during the performance of surgical operations generally. All narcotic medicines will produce conditions of anesthesia, in which surgical operations may be performed without pain. During the action of alcohol on the nervous system, it is frequently supposed that it renders the subject insensible 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 it into surgical practice. The discovery was made during the performance of 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 similar 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 with the least sensation. This discovery was made 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 the course of the year the same discovery was made and realised the most sanguine expectations. 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 introduction of 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 a new agent - Chloroform, a terchloride of formaldehyde, acted more speedily 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 anesthesia. After this Dr. Snow found 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 fumigatum, which had been used by the alchemists as the basis of their phials, 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 the effect may be local or general. The first part of the nervous system which appears to be affected is the brain, and a kind of intoxication comes on in which the patient is excited, the intellectual powers are deranged, 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 in view of their discovery from the use of these agents. If, however, the use of the hand is prevented, 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 nerve centre affected is the spinal cord, and the functions of sensation and motion more immediately under the control of this part of the nervous system, are more or less affected. It is in this stage that the anesthetic agents come into play, for the function of the power left to maintain the functions of organic life. The heart, the lungs perform their functions, and other actions essential to life are carried on. These functions are, however, under the influence of these anesthetic agents, and should too large a dose of them be administered,
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 sub-stance was discovered by Liebig and Schonberg in 1831, and its chemical nature was investigated by Dumas. He first pointed out that the liquid which had been called chloric ether, and chloride of carbon, was composed as follows, C, H, Cl: and called it chloroform. Liebig has subsequently proved that it is the true chloride of carbon, or chloride of the base formyl. This substance is prepared according to the Pharmacopoeia of the London College of Physicians as follows:—Take of chlorinated lime iv. lb.; rectified spirit oss; water Ox; chloride of carbon broken into pieces. Boil together until the mixture is reduced to 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 heavier portion which subsides is then separated, and the chloride of calcium added to it, and frequently shaken for an hour. The liquid, which is then filtered, is the chloroform in its final distilled and 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 4·2. It has a fragrant ethereal apple-like odour, and a slightly acid sweetish taste. The maximum dose is 60 minims. At natural saturation it is soluble in 2000 parts of 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 anesthetic.

Administered in the form of vapour as an anesthetic, chloroform is much more powerful than ether. This effect seems to arise from its being much more sparingly soluble in the blood than ether. The quantity of chloroform says Dr. 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 obtain an equal comparison of physiological power, when inhaled in a similar manner, the volatility of ether to be taken into account. In order to perceive the relative strength of these two medicines, we may suppose that the air which a patient breathes is saturated at 60°;—the ordinary temperature of a dwelling-room,—with one or other of the vapours, and see how much air he would have to breathe in either case, in order to be narcotized to the third degree,—the extent of insensibility usually required in a surgical operation. Thirty-six minims is about the average quantity of chloroform given to a child weighing 12 pounds in the adult, and 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 25 cubic inches each. The quantity of ether usually required to produce the same amount of insensibility in the adult, is about ¼ 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 13 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 actual practice, the quantity of chloroform used is greater than this; for ether abstracts much more colorless than chloroform during its evaporation, thereby reducing the temperature of the air passing over it, and the sponge or whatever contains it, and limiting its insensibility to a 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, and with ether and chloroform 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 open it into a towel or any other receptacle, and apply it to the mouth and nostrils of the patient in such a way that 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...
inhaled than will produce the fourth stage of anesthesia. By removing the handkerchief from time to time the patient may speak or shout loudly, according as one seems desirable. Although the administration 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 measured and controlled with certainty. Such an instrument was early introduced and employed 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 containing vessel of the chloroform is surrounded with cold water, so that 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 excess of chloroform 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 atmospheric air, destroys the paralyzing 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 be still, 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 5, or even 6 per cent. of chloroform vapour may be safely administered, inanition of this mixture will not act directly upon the heart, but will give rise to other effects by modifying the normal discharge of the functions of life. The average time occupied in producing insensibility is from three to four minutes.

5. Then, it should be as much as from 8 to 10 per cent. of vapour of chloroform to atmospheric air is a dangerous mixture, as it suddenly charges the blood going into the heart with a poison capable of acting directly on that organ.

The cases in which 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 larynx in order to relieve the distension of the right cavities of the heart.

The cases in which air was first employed, and in which chloroform is to be recommended by anesthetists, are those in which operations producing pain are performed. 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 with the operator whether it be the best way to hazard of fatal effects for the sake of relieving a small amount of pain. Where chloroform is skillfully administered, there appears to be little or no hazard, but unfortunately it is not every one who is prepared to administer chloroform successfully. As a rule it may be stated, that it is not advisable for the surgeon who operates to administer the chloroform, and a competent assistant should always be employed to do this. Whatever may be the doubt in the minor operations of surgery, the beneficial effect of relieving pain upon the subsequent welfare of the patient in the capital operations of surgery, have led surgeons very generally to insist on its administration in these cases. It has now been shown, both by Dr. Simpson and Dr. Snow, that the fatal cases, after capital operations, more especially amputations, are fewer when chloroform has been administered, than when this or some other anaesthetic has not been employed. Looking to these results, it would appear that the administration of chloroform is of the greatest advantage; much greater than that sacrificed by its careless administration. When in addition to this it is recollected how great an amount of suffering is prevented, there can be little doubt as to the propriety of its administration.

It has been shown that certain portions of the system are less favourable to the administration of chloroform than others, but Dr. Snow has pointed out that in these states of the system, the pain of an operation would be as likely to act as injuriously as the chloroform. At the same time, it would appear that a certain number of the fatal cases have occurred in persons with diseased heart, and perhaps in these caution should be employed.
more in height, undivided by branches till near the top, and
covered by an ash-gray smooth bark; the leaves are 5 or 6
inches long and 3 or 4 inches broad, nearly opposite, oblong,
eliptical, shortly acuminate, coriaceous, smooth, shining,
and obscurely netted on the upper side. Families few-
flowered, small. 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 beebearer, on which the medicinal properties of the
plant depend. The following is Dr. Malagagn’s analysis of the
two:

<table>
<thead>
<tr>
<th>Beebearer</th>
<th>Tannin and resins</th>
<th>Starch</th>
<th>Fibre and albumen</th>
<th>Ashes</th>
<th>Water</th>
<th>Loss</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.56</td>
<td>2.53</td>
<td>4.10</td>
<td>62.92</td>
<td>7.73</td>
<td>6.45</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The alkaloid beebearer is obtained by decomposing com-
mercial sulphate of beebearer by ammonia; the precipitate
is then filtered and dried in a dish still moist with
moist hydrated oxide of lead, dried in a water-bath and ex-
hausted rectified spirit; an alcoholic solution of beebearer is
thus obtained. The alcohol may then be distilled from the
beebearer. If this is heated with ether a part will be left
undistilled. Mannich has called this another alkaloid
and called it siperine, but he now regards it as beebearer in
an oxidised condition.

When beebearer is obtained from its ethereal solution, it
is a yellow, amorphous, resinous-looking substance, but in
the form of powder it is white.

The effect of the Dibiru bark is the same as that of cin-
chona. It is bitter and tonic, and possesses antiperiodic or
febrifugal virtues. The alkaloid possesses the same pro-
perities, and from experiments which have hitherto been
made, although it is not so powerfully febrifugal as quinine,
it does not produce the headache, feverishness, singing in
the ears, and other symptoms which are sometimes found to
follow the administration of quinine. In intermittent and
remittent fevers, in neuralgia, and in some cases of constipa-
tion, it has been recommended, and especially in those cases
where quinine disgrades.

BENTHOOLETA. [BENTHOOLETA.] 

Cadmium, iodide of. The preparations of iodine with
the metals have many of them been found to be accidio-
cious in the treatment of disease both internally and exter-
nally. Dr. Garrod has recently recommended the iodide of
Cadmium for external application. "I had," he says,
"previously felt the want of an agent containing iodide,
and fitted for external application—those usually employed
having many objections. The free iodine, or iodine com-
bined with iodides of potassium, as occurs in unguentum
iodinii composition, P. L., is frequently too irritant in
its nature, besides which its disagreeable and, at the same
time, the action of the coltule 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 impossible to apply. The nitrate of silver,
when mixed with fatty substances, as not very readily ab-
sorbed 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 remembered that
iodine is not always used simply for its rubefacient or
counter-irritant action."

He adds, that the iodide of cadmium is not open to these
objections. Mixed with eight parts of lard it forms a per-
fectly 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 scro-
fulous glands, in joints affected by chronic inflammatory
disease, in various cutaneous diseases, and chilblains.

The iodide of cadmium crystallises in white 6-sided
mucous tables, and is soluble in water and alcohol.

Chromic Acid has been recommended by Mr. Marshall
as an escharotic. It acts as a caustic and is of greater
caustic and is of greater

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 prevent the disease growing, 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 inflam-
matary action. It is, moreover, a very strong caustic, but
which no serious consequences have been found to ensue.
Any superficial acid may be removed by a piece of wet
lint. The first effect of its application to the warts is to
produce a general acrid pain. In some cases, where an ulcer-
ated surface be touched, the pain is of a burning nature,
more lasting, but not so acute and intolerable as that caused
by the nitrate of silver, or by nitric acid, with or without
arsenic acid. After a short time the pain passes off, but
the inflammation remains, and the wart, with extraordinary
dependent on the expenditure of more or less inflammation in
the parts. This inflammatory action is accompanied by a
purulent discharge, and under its influence the morbid
growth is rapidly wasted, in some cases being thrown off
entirely altogether. In but one instance has there been any
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
is better, a piece of lint moistened with the solution of
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 four or eight days. The extreme period to
which the inflammation set up by the chronic acid has been
found to continue active is about four days. In severe
cases, where the warts are large, repeated applica-
tions are necessary, each being followed by less incon-
veniencing and more characteristic effects of the inflam-
mation. But in one instance, so far as hitherto observed, have
more than three applications been required, and in that there
was great neglect as to proper cleanliness and dressing."

Coc Liver Oil is an oil obtained from the liver of the
common cod, Gadus Morrhua, 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 1783 it was recommended by Dr.
Perceval as a remedy in chronic pneumatosis, and in
1800 Dr. Baldes stated it was a popular remedy in many
parts of Lancashire. In 1841, Dr. Bennett, of Edinburgh,
wrote a treatise on the ‘Oleum Jecoris Aselli,’ recommending it
especially in scrofulous diseases.

Although the oil is named after the Cod, from the liver
of which animal it is most frequently and abundantly ob-
tained, 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 a method different from that on the Baltic codfish
which are caught in the seas around that 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 to which it is no longer smelly.
Although more agreeable to the taste, it does not ap-
ppear that its therapeutical properties are improved by this
process. The following is Dr. De Jongh’s analysis of the
three kinds of oil which are to be found in the shops of
London:
young children who will not take the oil, cream has been substituted with advantage.

In the case of rheumatism and scorchorous swellings the external application of the oil has been attended with advantage.

The friction of the whole body in cases of phthisis and scorchorous diathesis has also been strongly recommended by Dr. McColloch.

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 druggists. The action of the oil has been used against compounds that if kept long the oil becomes rancid, and decomposition of the medicines take place. They are therefore best prepared extemporaneously.

**DEODORIZERS AND DISINFECTANTS.** Although these terms are frequently used synonymously, they do not have different meanings. Deodorizers 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 invisible. Indeed, many of the substances which are not attended with any smell at all, as those of the small pox, typhus and scarlet fever.

One of the most powerful deodorizers known is chlorine. This arises from its affinity for hydrogen gas which enters into the composition of those gases which affect the senses in a disagreeable manner, as sulphured, phosphureted, and carbureted hydrogen. As these gases have an injurious effect of their own upon the system, and affect the senses disagreeably, they are always to be got rid of as quickly as possible, and the various preparations of chlorine, more especially chlorine itself, and chlorinated lime and soda have been employed for this purpose.

The chlorides of zinc, iron, and the metals may also be employed as disinfectants for decaying and putrid bodies. One of the most effectual methods of evolving chlorine in the air has recently been proposed by Mr. Lamboss. It consists in obtaining chlorine from common salt by the following process. Take of common salt two table spoonsful, red lead two spoonsful, oil of vitriol half a wine glass full, water a quart. Mix the red lead with the salt, and add to it the water, stir the mixture well with a glass rod, and add very gradually the oil of vitriol in small quantities. The mixture will form a thick liquid, or solution of chlorinated soda and chlorine remain in solution. By exposure to the air the chlorine escapes very gradually and uniformly. When not wanted the bottle may be closed.

**Oxygen** is another powerful deodorizer. By the action of this gas the decomposing animal and vegetable substances decomposing at length become purified. It is however, desirable to supply oxygen faster than can be done from the atmosphere, and this can be effected by the manganeic acid and permanganate of potash. The acid consists of one part of manganese and three of oxygen, whilst permanganate of potash consists of one part of potash and two of manganeic acid.

These substances, more especially the permanganate of potash, give off readily their oxygen gas and on being mixed with decaying animal and vegetable substances render them perfectly pure to the smell. Dr. Hoffman is a report made to the Board of Health on these substances, in 1818.

"The manganeates and permanganes surpass in their deodorising and disinfecting powers most compounds which are usually employed for this purpose. Metallic salts, such as the compounds of lead, iron, and zinc, &c., act extremely well, if the odour to be removed arises from sulphured or combined hydrogen and ammonia, or substances analogous to the latter; when a metallic sulphide and a salt of a metallic amonium is formed. But, frequently, the odour belongs to substances of a different class, which are fixed by neither of the above means. In the case of this, the water, which in my experiments yielded perfectly to the action of the manganeates, was scarcely altered by the use of very considerable quantities of the usual metallic salts. Moreover, the oil of vitriol, commonly used by druggists in this, only taints the water, but does not entirely remove the taint.
ammonia-like compounds by that of a powerfully fixed alkali. The manganesates and permanganesates, on the other hand, destroy the smelling substances completely; containing, as they do, large rays of oxygen; the very agents which accomplish all natural destruction, they 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 alkaline solutions of nitrous oxide or lime (chloride of lime), the action of which is likewise permanent. The hypochlorites act with less energy and rapidity than the manganesates, and are in this respect inferior; but they have an advantage over the latter by their evolving chlorine in the gaseous state, and destroying 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, particularly in the case of plants, 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 manganesates and permanganesates, either contained in shallow vessels, or diffused over sheets of wire gauze.

"The manganesates and permanganesates 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 character, they have become useful, not only by the incalculable and erroneous use of hypochlorites, or of metallic salts, are scarcely possible with the manganesates and permanganesates, which are, moreover, in themselves completely harmless."

A solution of twenty grains of permangenate 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 a suppuration 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 substances articles thus affected by subjection 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 Deodorisation, published by General Board of Health, 1857.)

DIPHETHERITIS. [Phthis, Practice of, & 2.]

HYPOCHLOROUS ACID is a compound of phosphorus and oxygen, in the proportion of one equivalent of each. It may be prepared by the decomposition of phosphide of benzene in the presence of air. Such acids are readily formed by the action of the alkalis and oxides of the metals, forming hyposulphites. These substances have lately been introduced into medicine as a remedy for pulmonary consumption. In a paper presented to the medical profession of the United States by Dr. M. Moreton and Humboldt, it is said to be solid body occurring in nearly a sulphur of a yellow colour, friable, soft to the touch, of a persistent aromatic odour, with a mild and unoffensive taste. When this substance is administered to animals, they give off ammonia, and leaves hydrated hypochlorous acid.

IODOFORM, a compound of iodine, and the compound radical formyl. It was discovered by Serullis, and has been recently investigated in the United States by M. Wallis. It is generally obtained by MM. Moreton and Humboldt. It is a solid body occurring in nearly a sulphur of a yellow colour, friable, soft to the touch, of a persistent aromatic odour, with a mild and unoffensive taste. When this substance is administered to animals, they give off ammonia, and exhibit symptoms of great depression and exhaustion. The symptoms of depression are followed by convulsions, contractioes, and other effects upon the nervous system. After death they exhibit no signs of any marked looseness or unsteadiness.

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 fewer and less severe local effects. It has been observed to attend the action of iodine. They recommend it from its soothing properties in neuralgia 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.

KOSO or KOUSSO, the Abyssinian name for the flowers of the Brayera anthelmintica, a plant belonging to the natural order Rosaceae, has been introduced into European practice as a powerful remedy for worms. It has been known in Abyssinia upwards of two centuries, as an anthelmintic, and has been mentioned by several writers. The plant which yields it has been named after Dr. Brayer, a French 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 Kuntch, 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 tomentose-villoses branches, marked by the annular electrices of the fallen leaves. The leaves are opposite, thin, oblong, or oblong-lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. Stigmas adnate to the pedicel. Flowers dioscuia, small, and greenish, the calyx with the tube bibracteolate at the base and turbinate; throat constricted internally by a mem-
branious ring; limb 10-petale; the segments in two series, the five outer ones much larger, oblong-lanceolate, obtuse, reticulately veined, stellately patent, the five inner ones alternate, smaller spatulate. Petals five, inserted in the throat of the calyx, small linear. Stamens from fifteen to twenty, inserted along the petals. Filaments free, unequal in length. Anthers bicolored, dehiscing longitudinally. Carpels, two placed at the bottom of the calyx, free, unilocular, each with two small styles, exserted within. Styles terminal, exserted from the throat of the calyx, thickened upwards. Stigmas subulate-dilated, crenate-oblong.

This plant grows in Tyre, Agame, and Shoa, and is cultivated everywhere. But it is not grown throughout the entire table-land of north-eastern Abyssinia, at an elevation of 6000 feet. He found it at the mouth of the Abai (Bruce’s Nile) at an elevation of close upon 9000 feet. Bruce describes the flowers be as being of a greenish colour, tinged with white, and when fully blown of a deep red or purple. The petals, he says, are white. When prepared for medicinal use, the flowers are gathered before the seeds are ripe, and whilst some of the flowers are unopened. The bunches are suspended in the sun to dry, and afterwards packed as a remedy. When sent to this country it is packed, as is the Koso, in boxes, and the Koso is contained in leather. It has a very powerful balsamic odour. The following is an analysis of Koso by Wettstein:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasty oil, Chlorophyle</td>
<td>1-44</td>
</tr>
<tr>
<td>Water</td>
<td>2-90</td>
</tr>
<tr>
<td>Bitter acid resin</td>
<td>6-25</td>
</tr>
<tr>
<td>Tastless resin</td>
<td>0-77</td>
</tr>
<tr>
<td>Sugar</td>
<td>1-08</td>
</tr>
<tr>
<td>Ginger</td>
<td>7-92</td>
</tr>
<tr>
<td>Tannin, striking a green colour with iron</td>
<td>8-94</td>
</tr>
<tr>
<td>Tannin, striking a blue colour with iron</td>
<td>10-46</td>
</tr>
<tr>
<td>Vegetable fibre</td>
<td>40-97</td>
</tr>
<tr>
<td>Ashes</td>
<td>10-71</td>
</tr>
<tr>
<td>Loss</td>
<td>0-14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100-00</strong></td>
</tr>
</tbody>
</table>

There is nothing in the botanical structure, or in the chemical composition, or physical character of this plant, that is peculiar to it, save the peculiar smell. It is in fact a species of Anthelmintic. Yet there is no question on this point. The inhabitants of Abyssinia, from their habit of eating uncooked food, are very liable to the attacks of various forms of tapeworm, and the Koso is universally employed among them as a remedy. Every traveller attests its efficacy. It has also now been employed in France, England, Germany, and Switzerland with the same success.

The mode of administering it in Abyssinia consists in taking one or two of these flowers and infusing them in hot water. In England, 240 grains or half an ounce is regarded as a full dose, children from 7 to 12 years of age may take 160 grains; from 3 to 7, 120 grains; and not exceeding 3 years of age, 90 grains. This dose should be taken in the form of a decoction, the previous meal should be left at having been slitted. The flowers are infused in from 6 to 10 ounces of luke-warm water for about a quarter of an hour. A little lemon-juice is then to be swallowed, and the infusion being stirred up, the whole is taken, liquid and powder at two or three draughts at short intervals, being washed down by cold water and lemon-juice. In three or four hours, if the remedy has not operated, a dose of castor oil should be taken.

It is not known that the practice of using this remedy at first was its high price. When first brought to Paris it was sold as high as 14 l. 5s. per ounce. It is now (1858), however, sold at a moderate price. The most recent notice of this remedy is in the first volume of Dr. Kohlmeiser’s work on Animal Parasites, where the Royal Society of London has employed the following method:—Koso is macerated for 24 hours in cold water, and the boiled for half-an-hour. This infuses-decoction is then taken whilst fasting in two portions, without straining, and not later than 2 hours after. As is never seen any of the secondary effects, at the same time, the extremely fragmentary state in which the worm passes prevents me from giving the remedy a preference over turpentine and pomace. Yet, according to recent reports, the plant of Kousso, has employed the following method:—5gr of Kousso are macerated for 24 hours in cold water, and then boiled for half-an-hour. This infuses-decoction is then taken whilst fasting in two portions, without straining. And here I must add that the flowers of Asfassetida, as is also the leaves of Jasminum floribundum (Herba Zelini), is, as is well known, often added to Kouasso, and is even administered alone, in doses of 70 grains, as a remedy against Typhus.

In other respects, it acts as a pretty strong narcotic in lower animals, as, for example, when thrown into water it stupefies fishes. For these reasons I should in this case say, not so much that the agent is adulterated, as that it is often administered in combination with other Abyssinian remedies for tape-worm. According to my experiments, even the thick Tr. crassicolor of the cat died very soon if a white of egg mixed with a decoction of Kousso was given. The dose of the powder of Kousso is 5gr to 3j. For my part, I have always been more or less unlucky with this remedy, which, in the ordinary mode of administration, shares all the properties of Kousso. It produces sickness and violent pains in the intestines. In my own experience, I have generally seen the worm expelled in innumerous fragments after the use of this remedy or its preparations. I have only seen larger or smaller portions of the worm, or, at the utmost, the whole worm expelled by it; but have never found the head. In one case I certainly detected fragments of tapeworm in the evacuations for three months. Once I saw the worm passed up to the neck in the morning, but the head was expelled only after the patient had of his own accord at once more a second dose of Kouasso, and thus brought upon himself no slight pains in the bowels.

"Very recently Professor Martius, of Bruxelles, and Professor von Raimann, of Vienna, have described the mode of employing Kousso. According to Martius, the powder of Kousso always killed the worm, but in no case did the head pass away. He therefore endeavoured to isolate the active constituent of the powder: He obtained it in fine powder by the action of alcohol. It was otherwise with a soft resin of the Kousso, of which 3j were obtained from 5j of Kousso, but in which there was certainly still some red resin and viscid substance. This soft resin, or, more correctly, resin obtained by the alcohol filtered and filtered; the alcoholic solution was dropped upon sugar. As soon as the alcohol was evaporated, the solution was again poured upon the sugar, the whole was well dried, and reduced with sugar to the finest powder, sugar being added to the powder until it became of the same weight as 3j. This very finely divided resin was mixed with 3j of honey, and the whole administered in a period of 12 to 16 hours, commencing at four o’clock in the afternoon. The method was given (castor oil or a salt). In this way, with this resin kindly sent to me by Martius, I treated three patients in September, 1854; one of them being a very weakly boy of 14 years old. In all three cases the worm was expelled. The patient’s bowels were frequently opened (bisecately) and filtered. As I have never seen any of the secondary effects, at the same time, the extremely fragmentary state in which the worm passes prevents me from giving the remedy a preference over turpentine and pomace. Yet, according to recent reports, the plant of Kousso, recently in flourishing about which to which is described by Kumpfer. The botanical characters of the genus Nathe are as follows:

- Umbels, compound; involucres, absent; calyx, obsolete; fruit, thin, compressed at the back with a dilated border.
ridges 3, only dorsal; ytte, one to each dorsal faww, and two to the laterals; albumen, thin flat.

V. Assafetida, Falconer: Radical leaves 3-parted; segments, bipinnatifid with oblong- lanceolate, obtuse, decurrent lobes. The rootstock is a thin, the matters remaining at the crystallization of the sulpha of quinidine are of a complicated character, and probably consist of uninvestigated forms of alkaloids, similar to and more powerful in their action than sulphate of quinidine. Whatever may be the nature of these substances, they are now sold under the name of sulphate of quinidine.

The most recent publications on the medicinal efficacy of quinidine are a paper by Dr. Harting, in Smith's *Jahrb.,* 1855, and another, in the *Philadelphia Medical Examiner* for May, 1855.

Dr. Harting states that, from 12 years' experience in the treatment of agues, he finds it to be superior to the common sulphate of quinine. Dr. da Costa gives a summary of 63 cases of intermittent fever treated by quinidine. In many of these the disease was of long standing. The rigor were arrested in 49 cases by the first administration of the medicine, only 4 requiring a repetition. The quantity given varied from 1 to 40 grains; the average was 20 grains.

**Sanguinaria**, the Pensean or Canadian Blood-root, so called from the red colour of its juice. This plant is a native of America, and has long been used by the Indians on account of its acid narcotic properties. It has lately been introduced into European practice as a remedy for cancer.

The genus Sanguinaria has the following characters. Petals 8—12; stamens, 24; stigmas, 2; capsule oblong 2-valved, ventricose, acute at each end with deciduous valves, and 3 permanent placenta.

*Camptanthus* is a slender, early spring flower, and grows in most parts of the United States and Canada in woods. It is a smooth plant with a creeping root-stock, which emits a bright orange juice when cut. The leaves are radical, oblanceolate, linear, and the flowers reniform or heart-shaped, with large roundish leaves separated by obtuse sinuses. The underside strongly reticulated with veins paler than the upper, and at length glaucous. Peduncles solitary, axillary round, one-flowered, in which young leaf. Sepals, 2; petals, 8; stamens numerous, with yellow anthers. Ovary, oblong; style, none; seeds numerous, of a dark shining red colour. In their report on Dr. Fell's method of curing cancer, the surgeons of the Middlesex Hospital thus speak of this remedy.

"Whilst the medical profession are of the judgment of the inefficacy of blood-root in the management of cancerous discharges, we see no objection to further and much more extended observations of its effects in that disease. It is evidently a powerful remedy, and as an external application is, perhaps, equal to any drug now employed in England. But our hope of its usefulness in cancer is very small; and that becomes less still, when we remember that Dr. Fell himself never suggested that patients should continue the constitution for several months at the least, and that the healing of the wound, and the use of the sanguinaria pill in cases of internal cancer, or of those external malignant tumours which were rejected as unfit for local treatment.

It is probable that the use of this remedy in the cases alluded to, will lead to further trials of its properties, and it may yet be a valuable remedy in the list of Materia Medica.
THIERRY, JACQUES-NICHOLAS-AUGUSTIN, the distinguished historian, was born at Blois on May 19, 1765. In 1806 he commenced his studies in the college of his native town. He was first a pupil of the Jesuits, but 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 a devoted disciple. In 1816 publicized histract "Des Nations et de leurs Rapports mutuels." He however shortly penetrated the fallacy and shallowness of his master's doctrines, abjured them, and became with Comte and Duroy the editor, in 1817, of the "Censeur Européen," a newspaper which he conducted with great success. He transformed 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 perverted ingenuity, but with perfect consistence and conscientious industry and perseverance in historical investigations which he then commenced, he has supported in all his subsequent works. On the suppression of the "Censeur Européen" in 1820 he proposed to the editors of the "Courrier Français" a series of letters on the history of France, for he says of himself that he had then found that history was true vocation, and he was accepted as a contributor. With the second letter commenced the controversy which he pursued his course; but on receiving several other letters of disapprobation, the editors wished him to vary his subjects. This he declined doing, and he ceased his operations in 1821. But his historical studies, which however he had to pursue under increased difficulties as approaching blindness rendered him unable to read, but he bore the deprivation with philosophical calmness. In 1826 he published his "Histoire de la Compréhension 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 a mind interested by, and pursued with pleasure and animated descriptions grouping the peculiarities of the time, and an animated 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 failing sight, occasioned his withdrawal from medical articles. In 1831, near Toulon, for the benefit of the sea-air of the Mediterranean, 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 made grand-croix in 1833. The member of the Academy on the day he died, 31st January 1835, 1831 to 1835 he passed partly at the warm baths of Luxeuil and partly at Vesoul in Haute-Saône, during which time, with the assistance of his brother, he composed his "Dix Ans de Recherches 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 "Récueil des Documents inédits de l'Histoire du Tierre-États," 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 his prize, and of which also there is an English translation. A collected edition of his works was published in 1853. He died May 21, 1856.

As an historian Thierry takes rank with Michelet and Guizot. Less profound in philosophical disquisition than Guizot, less elegant and imaginative than Michelet, he excels both in the power of grouping large masses of detail, and of seeing and presenting every point of interest or importance; he combines picturesque effects with minute knowledge; and the style is earnest and incisive though not always austerely so. He is more than the mere history writer; is consistently devoted to his vocation. While nearly every French writer of eminence looked forward to political influence or employment as his reward—and many carry on their studies often having abandoned the previous principles or opinions—Thierry held on his work undeviatingly. His consolation under various afflictions he has himself stated: "Blind and suffering, without hope and without intermission, I will give this testimony which from me no one will dispute, of the value of those physical enjoyments, better than property, better even than health; it is a devoted attachment to a science."

JULES THIERRY, whose chosen name was O'Jarephanick, was born at Thiers in 1831, and was of essential service to him in his then state of total blindness. In 1838 he published 'Sobres de Mours aux 18me et 19me Siècles, for which her husband wrote an introduction. She was also the author of a number of clever essays in the 'Revue du Deuxième Empire.'

THIOSSAINAMINE. [CHEMISTRY, § 2.]

THOM, JAMES, who acquired considerable temporary celebrity as a sculptor, was born in Ayrshire in 1799. He was brought up at the stone-mason's art in some stately mansion. He went to Rome, and obtained a commission to execute a statue of the poet, which was afterwards sold to Samuel O'Farrell, of New York. On his return to Scotland, in 1818, he was engaged to execute a statue of the Duke of Manchester, and was then about to begin a monument of the Duke of York, when on the 2nd of August, 1819, he died. A bust of his work in marble, executed by himself, is preserved in the National Gallery in London, where it was exhibited in 1824. He was also an accomplished writer on the art of sculpture. Some small figures which he carved illustrative of the poetry of Burns secured him a local fame, and he was tempted to try his chisel on other life-like figures. He accordingly produced in sandstone statues of Tam O'Shanter and Souter Johnson, which had a surprising run of popularity. After being successfully exhibited in Scotland they were brought to London, where they proved equally attractive, and the self-taught sculptor found himself for a time 'a lion.' He was commissioned to execute a statue of the Duke of York, and was then engaged in small plaster 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, and are notaltogether calculated to do honor upon the 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 engaged to manage his affairs, caused him to lose most of his funds; and the 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 success, and was able to pursue this line of life without further interruption. He died at New York on the 24th of April, 1850. The original figures of Tam O'Shanter and Souter Johnson, are placed in a building attached to the Burns monument on the banks of the Doun; there are copies of them in England, and at Mr. Colt's, Paterson, New Jersey. His group of Old Mortality stands at the chief entrance of the Larch Hills, in New York.

THOM, WILLIAM, the weaver-poet of Inverury, was born at Aberdeen in 1799. At ten years of age, with barely the elements of education, he was bound for four years to a weaver as apprentice. In his early days he had a passion for reading and writing. He was always a poor boy, and it was when he was required to help weavers that he first, "picked up a little reading and writing," trying at the same time to acquire 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 "German flute," and "every Scotch song that is worth singing." He married about 1829, had a family, and after some other removals settled for a time at Newly, near Cupar-Angus in Forfarshire. He was then where the great commercial failures in America occurred, one consequence of which was the composition of employment for the poor hand-loom weavers. With a wife and four children, without work, in a neighbouring village where nearly all were as poor as himself, and in a country where the poor laws were not yet introduced, the sufferings of the family were extreme, and in a cold spring day of 1837 they resolved to set off to walk to Aberdeen, in hopes that there they might procure employment. Of this journey he gives a vivid and pathetic narrative. One child died on the way, and of the wife, in order to obtain the means of procuring bread, he had recourse to his flute, which sometimes brought him trifling gift, and he made his first attempt at song-making in an address to his flute. This he had printed, and by presentation to the earl of Aberdeen in 1838, he received sufficient to enable the family to reach Aberdeen. He obtained work, first in that town, and then at Inveraray. In November 1840 his wife, whose health had been weakened by her late sufferings, died in childbed. His new affections again drove him to poetry, realizing Shelley's words that poets "learn in suffering what they teach in song."
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He sent one of his compositions, 'The Blind Boy's Pranks', to the 'Aberdeen Herald', where it was inserted with much commotion. On his way home he met a man named Knockpeoch, a gentleman in the neighbourhood, who 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 celebration which is optional for a poet. In his case of Burns, a patronage that only enhances the bitterness of the fate to which its objects are almost inevitably consigned. Then returned to Inverary, resolving, he said, not to be too much elated by the applause he had received, but it was not enough to last him. He published in 1841 at Aberdeen, a small volume of poems, 'Rymes and Recollections of a Hand-Loom Weaver', which had but a moderate success. His poetical powers were not great: his verses consist in the exact reproductions of feelings he had himself experienced, with a melody of versification and a correctness of taste remarkable in one of so extremely limited an education. He married a second wife, was often subjected to the extremest need, and at last died in great poverty in March 1850. His widow died in the July following, and a subscription was raised of about 200l. for his destitute children.

THOMSON, WILLIAM, a celebrated Irish naturalist. He was received into the medical faculty at Dublin, and William, his eldest son, was born on the 2nd of November 1805. As his father destined him for a commercial life, he received such an education as was supposed to fit him for that pursuit. In 1821 he was apprenticed to a firm in the linen trade, but finding himself unsuited to that life, he acquired no taste for natural history, he soon took an interest in this subject from making excursions with a fellow apprentice who possessed a copy of Bewick's 'British Birds,' and a passion for collecting and stuffing birds. For several years he was hardly more than an amateur; but in 1832 circumstances occurred which induced him to give up business, and from that time he devoted himself in earnest to natural history. Although birds were his favourite study, he directed his general practice to all groups of animals and plants, and eventually there were few Irish minerals, plants, and animals, with which he was not cognisant. He first became known as a naturalist by his contributions to the 'Proceedings' of the Zoological Society of London, on the natural history of Ireland. The names of some of these early contributions indicate the direction of his mind: Catalogue of Birds new to the Irish Fauna; On some Vertebrata new to the Irish Fauna; On some rare Irish Birds. He went through the whole range of the vertebrates, and Elasmobranchs, and worked out with great care the classification of a new Genus of Fishes; On the Irish Hare. He also prepared to lay before the meeting of the British Association for the Advancement of Science, held at Glasgow in 1840, a Report on the Fauna of Ireland, Division Vertebrata, which was read before the meeting. He described the vertebrate animals of Ireland, or an account of their comparative scarcity and abundance, but an exposition of the number of species in Ireland, the most western land of Europe, it is not only enriched with other British and European species. In 1844 Mr. Thompson accompanied the late Professor Edward Forbes on a voyage in the 'Zoean' in H.M.S. Becon, commanded by the late Captain Graves, R.N., during which he made a large number of observations on the natural history of the countries which he visited. Some of these he subsequently made use of in his works on the natural history of Ireland. From 1841 to 1848 he was a frequent contributor to the 'Annals of Natural History,' and also engaged in collecting materials for his further report to the British Association on the Invertebrate Fauna of Ireland. This report was read at the meeting of the association at Cork in 1843, and is remarkable for the large amount of minute information it contains on the natural history of Ireland. From this time his papers on Irish natural history became more numerous; a list of above seventy is given in the Ray Society's 'Bibliography,' and these were preparations for a great work which he had projected on the natural history of his native country. The first volume of this work was issued in 1851, and the second in 1853. These three 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 1852 in Belfast. In promulgating this project, he died on the 1st 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 it was published with a short memoir of the author in 1856. Unpublished also were papers 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 a member of several other scientific societies. 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 who, having to seek the most miserable monographs on the distribution of animals in Europe.

THOMSON, ANTHONY T. B., was born in Edinburgh on the 7th of January, 1778. He married Ann, daughter of Robert Bottchman, a celebrated professor of natural history in the University of Amsterdam, and obtained lucrative appointments under the British government, being Postmaster-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 prior to this, whilst his mother was on a visit to Edinburgh. He married, in 1764, Ann, daughter of Sir John Hay, 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 to follow a study in which he had already acquainted himself with medicine. He attended the lectures of Munro, Gregory, Black, and Dugald Stewart. In 1798 he became a member of the Spectaculo Society, and the companion of Jeffrey, Horner, Brougham, and Lord Lamingden. In 1799 he became a member of the Royal College of Physicians, and 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, and a general practitioner he continued when once commenced it was never interrupted. In the midst of a large general practice, he found time to cultivate science and literature. He was mainly instrumental in procuring the enactment 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 been translated into French, and is called 'London Dispensatory,' which was a work of great labour. 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 appeared. In 1833, he published a large collection that he made in the course of his practice, which he called 'The Chemical Pharmacopoeia of Great Britain.' He died at his residence in Sloane-street, Chelsea, on the 13th of July, 1839. He was one of the most learned and most able of his time in the practice of medicine, and that he was one of those who appreciated the value of this instrument when its use was generally neglected. From 1826 he was a member of the Royal College of Physicians of London, and commenced practice as a consulting physician. In 1826 he was elected professor of Materia Medica to the London University, now University College, and 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 college had not the means of purchasing it after his death, and it has been lost to the country. In 1832 he was appointed professor of Medical Jurisprudence. The lectures delivered from this chair were published, and they were well received. In 1839 Thomson published his 'Elements of Materia Medica,' a work of a more scientific character than his 'London Dispensatory,' and entering more fully into the subject of Therapeutics, and was one of the last to be heard of the death of Dr. Todd. He died at his residence at Sloane-street, Chelsea, on the 13th of July, 1839.
he was engaged in preparing 'A practical Treatise on Diseases affecting the Skin,' which has since been completed and edited by Dr. Parkes. In 1848 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 Edgeworth, near Huddersfield, 1849.

Dr. Thomson was a man of unwaried industry, and throughout his long career, pursued his labours with few or no interruptions. He was a man of varied attainments, cultivating literature and art, and was not an unfrequent contributor of literary articles to the Magazines and Reviews. He translated from the French, and edited, a work by Mons. Salverte, entitled 'The Philosophy of Magic, Omens, and apparent Miracles.' His notes to this work are of great value, and interesting. 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 'Cyclopedia 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 his noble princely character may be 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, Perthshires, and received his early education at a private school in his native place. He 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 that subject for nearly fifty years. He was one of the editors of the 'Encyclopedia 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 abandoned so generally as to be 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 he 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, and in his later years by his nephew and son-in-law Dr. R. D. Tait. In 1826 he delivered a course of lectures on botany in the University, and 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, succeeded for his botanical knowledge; he has published an account of his travels in Thames, and is now the superintendent of the East India Company's botanic gardens at Calcutta.

THICKLY RIVERS. [CANADA, S. 2.]

THIRTIF, the common name of the Statics Armeria, Smith, now Armeria maritima. Armeria belongs to the natural order Plumbaginae. It is distinguished by the flowers being in a head contained in an inverted cylindrical sheath, and not in a sort but borne in clusters. A. maritima, Thrift, is a common British plant, growing on muddy and rocky sea-shores, and on the banks of salt-water estuaries. It bears transportation to gardens, where it is a favourite in forming the borders of flower-beds. It may be easily distinguished from other species by its linear 1-nerved leaves. It has rose-coloured flowers. Several varieties are described.

THUREA. [Boswellia.] [TLIERS, S. 2.]

TIECK, CHRISTIAN FRIEDRICH, a celebrated sculptor, brother of Ludwig Tieck, was born in Berlin on the 14th of August, 1776. Having studied awhile under Schadow, he in 1796 proceeded to Paris, where he became a pupil of Bosio. In 1801 he returned to Berlin, and afterwards went to Weimar, then a great centre of literary and artistic activity. Here he found Götze a warm and most valued friend and adviser, and whilst here 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., a family which is one of the most distinguished in Prussia. Here he became acquainted with the sculptor Calandre, Drobie, Augustus Schlegel, and M. Rocca. For Ludwig of Bavaria he executed at various times busts of Ludwig himself, Jacobi, Schelling, Ludwig Tieck, Lessing, Erasmus, Gottlieb, Herder, Wallenstein, and several others, chiefly for his gallery at Munich. In 1821 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 palace of the Crown Prince at Potsdam; the angel in the porch 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 Kuppin, besides several monumental works and statues of celebrities. Tieck died in 1826. In 1827 Tieck died, not possessed of much imaginative power; he executed some good statues and reliefs, 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 worked, among whom is the celebrated Carl Noack, the Kiss, the sculptor of the Amazon. 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 aridour; 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 usual classical models, and exercised themselves on the feelings and opinions of what may be termed the German chivalry or romance of the Middle Ages, although his first efforts, 'Almamur,' a prose idyll, in 1790, and 'Alia' in 1791, gave a great stimulus to the national literature 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 tragical romance (The Parting), also in prose, which, like most of his other dramatic pieces, is more popular 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 much interest; and 'Abdallah,' an oriental tale, with little of oriental colouring, and of a ghastly terror-insepiring character. He had made much progress in the study of English literature, particularly the drama, and in his 'Almamur,' and 'Alia,' he had already composed a paraphrase of Ben Jonson's 'Volpone,' in three acts, in which it is remarkable how carefully he has omitted all the more poetical passages which ornament the original, and in which, for the scene before the mayor of Padua, the popular parson, he substitutes a satirical one between an Englishman and a German author come to England for a few weeks to write volumes on the character of the country and its inhabitants. To the same period belong also his novel of 'William Liebig,' where the character of the author is represented as being in England, but they have a very foreign air, and the tone of the whole is more gloomy than most of Tieck's productions.

The last years of his life, from 1795 to 1800, both inclusive, was a period of incessant activity. During it he travelled; visited Jena, where he formed an intimate friendship with the two Schlegels, Novalis, and Schelling; Weimar, where
he became acquainted with Harder; 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 career. While still adhering to the romantic school, his productions embraced a wider field. He continued to write tales, novels, tragedies, and comedies; but in embodying nursery tales, as in his 'Blahnt,' a play in five acts, 'Die Sieben Weber der Welt,' and 'Das Hofvolk,' and many others, he exhibited the same manner 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 Octavianus,' a work which had been long neglected, 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 proscenium element, and a poet, to whom comes Romance, a female, who describes herself as insinuating 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 famous specimen of Tieck's versification. It is not of the most careful construction; and the passages that are quoted as examples of an Art-loving Mind, written in conjunction with his friend Weckroeder, 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 connoisseurs, and a manifestation of a true poetical feeling, to which Faith and Love adhered about this period. Perhaps less distinctive as a class, as his previous tales had much of a similar character, were his 'Volksmährchen' (Popular Legends), such as the history of Heymon's Children, the 'Fair Magelone, Melusina, &c., legends which are European, and the 'Denkärdige Geschichtschronik der Schildbürger' (Memorable History of the Simpletons), a sort of German version of our Men of Gotham; tales in prose, abounding in pleasant fancy, interspersed with the merriment and gaiety which the readers of these tales so fondly love. He also became 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 wit and humour of the dialogue. Many of the productions of this period, including most of those above-mentioned, were subsequently published together, under the title of 'Phantasius,' a frame-work of a conversational party, to whom occurred the prologue of the 'Hans Sachs,' and the epilogue of the '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 1795, Tieck wrote and published F. Schlegel in bringing out the 'Mussen-Almanach,' to which he contributed some of his tales. He then lived for a time at Berlin, and next at Ziegenburg near Frankfurt-on-the-Oder, seeming to enjoy a poetical leisure, during which he produced nothing but 'Kaiser Octavianus' of which we have already spoken, in 1804; and in the same year he made a journey to Italy, returning from thence in 1806 to Munich, where he had the first attack of gout, from which he never recovered. Tieck's style was so violent, that he produced little for several years. He occupied himself, when able, in revising and adding to his previous works, the 'Phantasian' as above stated, and a collection of his poems; in studying and collecting the early printed editions of the German classics, and in 1799 he published 'Minnelieder aus dem Schwäbischen Zeitalter' (Love songs of the Swabian period), and in 1815 'Uhrlehr's von Lichtenstein Frauenendienst' (Worth of Woman); and is extending his acquaintance with the English drama. In 1810 he published a volume of his own translations of the old King John, the Pinder of Wakefield, Pericles, Locrine, the Merry Devil of Edmonton, and the old Lear, all of which he contends are the genuine, though chiefly early, productions of Shakspere. In 1817 he published two volumes of specimens of the early German drama, and in the same year visited England for the purpose of acquainting himself with the literature connected with the dramas which he could not procure in Germany. He laboured diligently; the treasures of the British Museum as well as those of many private collections were opened to him; and it is probable that no foreigner ever attained so wide and so exact an acquaintance as Tieck with the English literature of the great Elizabethan period, or so just an appreciation of Shakspere's genius and Work. Tieck, with his love of poetry and discovery of beauties hidden from Englishmen in the apocryphal or rejected works attributed to Shakspere, in the genuineness of nearly all of which he is a stanch believer, but with his clear and impartial judgment, has formed a more sober judgment. On his return to Germany he settled at Dresden, and for some time his literary publications were chiefly novels and tales for the pocket-books and similar annuals. In 1821 he published the first volumes of 'Shakspere's Werke,' which is the first complete edition of Green's 'Friar Bacon,' 'Arden of Faversham,' of which he has doubt whether it is a production of Green's or an early work of Shakspere, and Hoywood's 'Lanashire Witches;' and in 1823, 'The Death of King Lear.' This last publication containing 'Fair Em,' 'The Second Maid's Tragedy,' by Musseniger, translated from one of the three manuscript plays saved from the fire by Warburton the herald, and the Birth of Merlin: the first he considers to be more probably an early effort of Shakspere's than any of the other names to which it has been assigned, grounding his opinion of this and other of the doubtful plays on the belief that Shakspere commenced writing for the stage many years earlier than had at that time been admitted; a belief which is now generally established. In 1817, a collection of reviews or criticisms of modern German plays, including notices of Sottier's 'Picolomini,' and Wallenstein's 'Tod,' Göthe's 'Jery und Bäutele,' and Clavigo; and Shakspere's 'Romeo and Juliet,' 'Lear,' 'Henry VIII,' 'Macbeth,' and 'Hamlet;' all containing much genial criticism, with a delicate and true apprehension of their poetical feeling and harmony; with notices of the acting of Kemble and Keenan; and Appendices on the German and English stage. Above all, it may be said, that 'Zahrt's Travels' was an active part of the passage of the fifth act of Shakspere's acknowledged plays, which had been begun by Schlegel, and of which the first volume appeared in 1825. The merit of this translation, of which many were entirely from his own hands, and all were subjected to his revision, are universally acknowledged. Less literal, but more spirited and equally true to the sense of the author, than the previous translation by the Vosses, they are illustrated by a number of notes which display a great amount of learning and research. They are the work of the editors to various disputed readings, and they now form the recognized text of Shakspere's plays in Germany. The work was completed in 1824. But his labours were not confined to this vast undertaking; he prepared several new editions and translations, and in 1825 he published his novel 'Dichter' leben,' (Life of a Poet) in which Shakspere and several of his contemporaries are introduced, and in which the death of Marlow is vividly described. In 1826 he published 'Der Tod des Dichters,' (the Poet's Death) in which the
unhappy fate of Canoens is pathetically related. In 1826 he also produced one of his most picturesque narratives, 'Tters kther', a story of the insurrections in the Gennes regions is graphically told, but unfortunately 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 attended by the literary circles, who were much in the vicinity and could gain admission. In 1836 and 1840 he published his two latest novels—'Der Tischlermeister' (The Cabinet-maker) and 'Victoria Accorbona', both of which are of the highest importance to many 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 Frederick William IV. to the throne of Prussia, Tieck was invited to Berlin, an invitation which he accepted; he afterwards created him a 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 1839 and 1849. At various times he also edited Novalis's 'Schriften', in conjunction with Friedrich Schlegel, 1802; Heinrich von Kleist's 'Nachgelassenen Schriften' (Posthumous Works), 1826; Solger's 'Nachlass und Briefwechsel' (Remains and Correspondence), 1826; the 'Reinhard Lens's Gesammelten Schriften', (Collected Works) in 1828. After suffering for some years from continued illness, borne with wonderful patience and cheerfulness, he died at Berlin, April 28, 1855, leaving a name which may rank with the highest in his native land and in the Englishmen may reverence as that in which is Germany is most connected with the popularising of the fame of the great dramatic poet of England.

TIL, a genus of Plants belonging to the natural order Cruciferae. It has a 3- or 4-parted calyx; petals 3 or 4, oblong acuminate; scales none, or very small; carpels 3 or 4, somewhat constricted in the middle; 2-seeded. The species are small glabrous annual herbs, in erect, slender, slender, pubescent and pubentulous places. The leaves are opposite. Flowers small, white, for the most part axillary.

T. muscosa 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, connotate; sepal ovate, acuminate, bristly-pointed. Petals nearly subulate, white, tipped with red. There are several other species, natives of North and South America and Australia.

TOAD. (Boraciac Acid.)

TINEI.ZE, a family of small Moths, which are remarkable for depositing their eggs among animal substances, on which their larvae afterwards feed. They are thus constantly upon clothing made of hair or fur, and are called Clothes-Moths. The family is thus defined.---An


temperate moderate, slender, simple, pubescent beneath in the male; proboscis short; thorax rarely crested; body long and slender; wings entire, often narrow, maily convoluted in repose. The caterpillars live in portable cases formed of various materials.

These moths are often ornamented with very brilliant colours, the upper wings having golden or silver spots. The caterpillars make their cases of the substances on which they feed, and make their nests of bits of leaves. The true Tineae are the theme of the hair of the skins of animals and bits of silk. When too small, they slit their cases and make them larger. Many of them burrow into skins, silk garments, &c., making cases as they proceed. The genera and species are very numerous.

(Weevil. Entomologist's Textbook.)

TIPTON. (Staffordshire.)

TIPULID.E, a family of Dipterous Insects belonging to the order Diptera. They have the antennae longer than the head, simple, not divided into two parts. The whole body, except the legs, is covered with fine silvery hairs. The proboscis is short, ending in two large flasky lips; body elongated; wings long, nervures numerous; legs long.

The name is given to the species of Cephalopod, Pedicul, and the species of Tipula which are usually known by the name of Daddy-Long-Legs.

LaBelle divides this family into five smaller groups—Caliciformes, Galliiloze, Terielleos, Fungivores, and Florae.

The Caliciformes (Chironomidae, Macquart) 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 a large bow of swimming hair, which are transparent, and form exceedingly beautiful objects for the microscope. The larvae of Chironomus plumosus are vermiform, and of a blood-red colour, whence they are called Blood-Worms. (Chironomidae.)

The Galliiloze (Cecidomyiidae) include those species which form galls by depositing their eggs upon plants. (Cecidomyiidae.)

The Fungivores (Myxophtharia, Macquart) embrace an extensive and active group of these insects, which are capable 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 said to be partial to Fungi, hence their name. They are generally found in the interior of Boleti and Fungi.

The Terielleos (Tipulidae, Macquart) are the true Crane-flies. The species of the genus Tipula are found in damp meadows in great numbers, especially in the autumn. The species of Tipulum are found in grassy places, various trees, etc., and occasionally they 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 Florae (Bibionidae, Macquart) 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.

(Weevil. Families of Insects, TOLMORDEN. (Lancashire.)

TOLLENS, HENDRICK CORNELISZON, long the most popular living poet of Holland, was born at Rotterdam on the 24th of September 1780. His father carried on a thriving business in textiles, which he added to. Little by little, the business was extended, and Tollem earned from it. At the age of fourteen he was sent to the university at Amsterdam, where he lived for some months, then left for Paris, and in colours, and Hendrik was taken from school at the age of seventeen, made the acquaintance of two poets, one of them, Heimers, a merchant, the other, Loots, a schoolmaster. Hendrik was introduced to them by a friend to whom they introduced him, was a respectable bookseller. Hendrik had learned some French at school; by Ulyenbrock's advice he now studied English and German, and thus enlarged his ideas; he failed he following Ulyenbrock's example in occupying himself with rendering French tragedies into Dutch verse. He afterwards ventured on original dramas, and his 'Lucretia,' written in 1805, had, at all events, sufficient spirit to be prohibited by the government. Another tragedy, 'De Hoogen en Kabeljauwonens' (The Hooks and the Codfish), had, at least the merit of a national subject, being founded on the quarrels of the rival factions of these names, the Geuzhs and Ghibelines of Dutch medieval history, whose hostilities, which lasted a century and a half, are said to have arisen in 1530 from a jeer dispute between some nobles at a banquet as to whether the codfish could be said to take the hook, or the hook the codfish. Tollem's powers, however, did not lie in tragedy. In two contests with his friend Loots on subjects offered for prizes, one on the theme Hugo Grozus, and the other the death of Egmont and Hoorn, he won the second prize on the first occasion, and the first on the second; and in 1807 a short poem by him 'To a Fallen Girl,' attracted the attention of the French emperor. His other subjects were almost universally taken from national history and from domestic scenes, and though even his admirers did not place him on a level in point of genius with Bil-


'3187. The 1st edition of the
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 celebration from taking place. Altogether 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. Nederomeijer van Rosenthal, waited on him at his house at Haarlem, and, in the name of the municipality 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 waited on him the same day to offer him a gold medal, with the inscription: "Nederland zijnen geliefden 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, 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 Wintertaking of the Hollander on Nova Zembla), commemorative of the celebrated voyage of Barents in 1596-97, is very popular and has often been reprinted, on one occasion in an illustrated edition with engraving on steel. In 'The 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 'Overwinnin bij Chatham' (Victory at Chatham), a poem of 1677. In 'The Days of the English' he is a fertile author of ballads on subjects of Dutch history, among which his 'Jan van Schaaffelaar,' 'Kanaal Hasselaar,' &c., are conspicuous, his 'Vapenknecht' ('Call to Arms'), written on occasion of Napoleon's return from Elba, is one of his best productions. Tollens translated much 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 some of them are Dutch, which most remarkable of the 'Young Lochinvar,' which has also been done into Dutch by Van Lennep, under the title of 'De Heer van Caulemborg.' Tollens's works, of which a new edition is now publishing, are of some extent: his shorter poems alone occupy about ten 8vo volumes, not very closely printed.

TOLUOE. [CHEMISTRY. S. 2.]

TOOKE, THOMAS, one of the two sons of the Rev. William Tooke, was born in 1773. He published in 1838 'The voyage from the Cap of Good Hope to the Cape of Good Hope from 1793 to 1837, preceded 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 fifteen years before, contained new and important details. In the following years he wrote a work on "The History of Prices," 4 vols. 8vo. 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 of 1844, Mr. Tooke afterwards published a tract, in which he was assisted by Mr. Newnham, '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 were 'A History of Prices and 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 1792 to the Present Time, by Thomas Tooke, F.R.S., Corresponding Member of the Institute of France, and William Newnham,' 8vo., 1857. The sixth and eighth volumes, besides being 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 in the different parts of the United Kingdom, the System and progress of the Free-Trade Movement, the State of Finance and Banking in France, and the New Discoveries of Gold. Mr. Tooke died in London, Feb. 26, 1846, being then within a few days of his 74th year. His younger brother, Tooke William, F.R.S., is still living.

TOOTH-TISSUE. [TISSUES, ORGANIC, S. 1.]

TOOTTING. [SUBURB.]
The amnesty of 1832 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, Martínez de la Rosa, he was named Minister of Finance. The pro-sisipha of finance occupied his attention almost exclusively for some time, and prevented his sharing the unpopularity of his chief, so that, when in 1835 Martínez de la Rosa was compelled to retire, Toreno succeeded to his post. He resigned, and emerged as a liberal in 1837, when he was elected to the constituent 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. Toreno, who was now decidedly a 'Moderado,' grew more and more distinguished, and was in frequent correspondence with Mendizabal, and allied to persevere by forcible 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 seven different places, and Toreno and Martínez de la Rosa were left without a seat. The disgraceful revolution of La Granja followed, the constitution of 1812 was proclaimed, and Toreno, now far declared openly and hopelessly a liberal, he 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 return to Spain, and in the following year the Cortes, in the last days of the first government, in Germany and Italy, was in Paris, 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 16th of September, 1845, but his remains were conveyed to his country, and his ashes were laid in the church of Sta. Maria la Real, at Madrid.

Toreno's 'History of the Insurrection, War, and Revolutions of Spain' ('Historia del Levantamiento, Guerra, y Revolución de España'), is the great Spanish work on that interesting subject. That it is a Todeal of a tour in Germany and Italy, was in Paris, 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 16th of September, 1845, but his remains were conveyed to his country, and his ashes were laid in the church of Sta. Maria la Real, at Madrid.

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in front; legs of equal size, short, ending in two hooks. *Chelif er cancris* found in herbriums, old books, etc., where it feeds upon the minute insects which frequent such situations. Family 3. *Phalangidae*, Shepherd-Spiders.—Mandibles very conspicuous, composed of two or three pieces, free, ending in a didactyle pincer; palpi filiform, ending in a hook; body short, rounded; abdomen segmented; legs elongated; habitually comprises the well-known form called *Harvest-Man*.

Sub-Class III. *Aperoranchiata*. This sub-class includes the genera *Nymphon* and *Pycnogonum*, which are the type of the orders *Nymphonidae*, the Sea-Spiders, and *Pycnogonidae*, Parasitio Sea-Spiders. These are often referred to the class *Crustacea*.

**TRACHYPHONUS. [Woodpeckers.]
**

A genus of *Fish* belonging to the riband-shaped forms of *Acantopharyngi*. The body is elongated and compressed; dorsal fin extending the whole length of the back, a few of the anterior rays sometimes elongated; vertical 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 Vagmnaer, or Deal Fish, is described by Dr. Fleming in the 'Magazine of Natural History.' He was taken in the North Sea, but of late has been much frequent in occurrence in Scotland. The species found in the north of Europe differ from those of the Mediterranean. One species only has been recently caught alive at Sunda in the Moluccas, where the length of the body is excessively compressed, particularly towards the back, 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 an orange colour, occupying the whole ridge from the head to the tail, with 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 species, probably to the number of a dozen or more, appear to have been obtained on the island of Sunda between 1817 and 1839. The Vagmnaer is rare in Iceland. It differs from the two species found in the Mediterranean, T. fals and T. iris, and also from T. lepisorus.

**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 matters relative to merchant ships and seamen, and 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 order, and consider reports made to it by its inspectors and other persons concerned therein. Working conditions, wages of seamen, strength and condition of steam-vessels and their machinery (14 & 15 Vict. c. 79). 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 were transferred to the Board of Trade, and the Railway Act of 1844 was enacted into law. Any person may present a report to the Board of Trade, or to the Board of Commissioners of Railways, of the condition of the railways within their jurisdiction.

**TRADE, SHIPPING, AND CURRENCY.** In the article *Trade* in the *Encyclopedia Britannica* we have given 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 values of imports and exports as given in the report for 1854, differ in a high degree from the official valuation, which was very fallacious. The extent 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 official report is a report 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 152,383,059L.; in 1856 it was 195,424,564L., and in 1856 it was 172,944,154L. These values 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 value set on the ships' despatch from the three years show less discrepancy; they were 124,136,018L., 117,254,881L., and 131,937,763L.

Our largest importations in 1856 were from the United States of America; they amounted to 36,047,736L. from Russia they were 11,661,924L., from France, 10,386,522L., from China, 9,421,681L. from Japan, 8,906,904L. from Holland, 7,433,442L. from the Hanno Towns, 5,305,739L. from Prussia, 4,534,815L. from Spain, 3,565,083L. from Belgium, 2,936,790L. from Spanish West Indies, 2,654,680L. from Denmark, 2,201,831L. from Portugal, 2,164,909L. from Sweden, 2,031,861L. from various states of South America, Central America, and Mexico, 9,736,381L. from the Western Coast of Africa, 1,657,317L. (this commerce has doubled itself within four years). From the Two Sicilies, 1,505,582L. from Greece, 1,427,289L. The imports from other countries are each under a million. The total of imports from foreign countries is 129,617,688L. The amount of importation was from the East Indies, 17,262,831L. The other principal amounts were,—the North American Colonies, including Newfoundland, 6,335,770L., the Australian Colonies, including New Zealand, 5,706,043L.;
the West Indies, 4,157,088 lb.; Mauritius, 4,247,007 lb.; Cape of Good Hope, 1,652,928 lb.; British Guiana, 1,416,284 lb.; and other colonies, 33,300,446 lb. The total value of the exports from British possessions of the value of 43,026,568 lb.

Of the exports, the total value taken by foreign countries in 1856 was 82,325,901 lb., and by British possessions, 33,300,446 lb. The British colonies and islands were our largest customer, to the value of 21,918,105 lb.; and they were the British colonies and islands.

Then follow the Hanse Towns, 10,134,830 lb., Turkey, including Syria and Egypt, 6,340,492 lb.; France, 6,432,650 lb.; Holland, 5,728,253 lb.; Brazil, 4,084,537 lb.; Spain, 1,743,488 lb.; Belgium, 641,604 lb.; Honduras, 414,671 lb.; China, excluding of Hong Kong, 1,416,747 lb.; Chili, 1,396,461 lb.; Cuba, 1,517,062 lb.; Two Sicilies, 1,205,183 lb.; Sardinia, 1,413,689 lb.; Sweden and Norway, 1,118,185 lb.; Denmark (including Holstein, &c.,) 1,094,280 lb.; Peru, 830,546 lb.; and other places above a million. Of the British possessions receiving exports, the largest export was by the East Indies (including Ceylon and Singapore), 11,607,436 lb.; Australia (including New Zealand), 10,173,240 lb.; North American Colonies (including Newfoundland), 6,410,228 lb.; British West Indies (including Guiana), 1,873,297 lb.; Cape of Good Hope and South Africa, 1,344,338 lb.; these are the only places that exceed a million, but Gibraltar takes the analyze, and the exports to the amount of 6,322,430 lb., which is considerably less than a half of the British increase. The total amounts also in 1856 were 7788 British ships with a tonnage of 1,304,453 entered in ballast; and 767 foreign ships, of 671,161 tons entered in ballast. The first ships cleared out in 1856 were 16,167 ships, 3,113,35 tons, with cargoes, and 3335 ships, of 577,553 tons entered in ballast; and in 1856 there were 17,363 ships, of 5,777,657 tons entered in ballast; and 711,161 tons entered in ballast; all the items showing a great preponderance in the increase of the British trade in their ports, notwithstanding the greater facilities offered to foreigners by the repeal of the old navigation laws. The returns include both steam and sailing vessels. Of its foreign vessels with cargoes, the greatest number in 1856 was from Norway, 2295 ships, of 486,744 tons; the next highest number was from Denmark, 355 ships, but only 194,698 tons, or less than one-third of the Dutch trade, which was 1,210,102, of whom the Netherlands, 1210, the United tonnage being only 462,460; the ships being entered to the low shores of Holland and the shallows of the North Sea; but, crossing the Atlantic, the United States, 130,365, ranked next in the list, and their tonnage was 1,376,631, approximately to a thousand less for each vessel. The burthen of the whole number of 18,51 British ships was 5,086,283 tons, an average of very near 280 tons for each. The total number of registered vessels, sailing and steam, was 30,012 in 1856, 1,315, of which the tonnage was 5,312,436, and the crews numbered 267,573 men, but this included the Channel Islands, and colonial possessions. In the British islands there were 6749 sailing vessels not exceeding 60 tons burthen, 5,428 vessels of 60 tons burthen and upwards, and in a total of 76,952 thousand tons, and 1,207,102 tons burthen, with 53,579 men, and 317 steam vessels, of 61,616 tons burthen, and 4694 men. Partly in the Home and partly in the Foreign Trade there were employed 26,958 sailing vessels, of 102,448 tons, including 61,512 tons burthen, with 53,579 men, and 317 steam vessels, of 16,102 tons burthen, and 963 men. In the Foreign Trade there were employed 8039 sailing vessels, of 2,942,674 tons burthen, and 110,716 men, and 492 steam vessels, of 247,377 tons burthen, and 1,745 men. In the United Kingdom, of which 921 were sailing vessels, and of these 33 were of iron, of an aggregate tonnage 187,005, and 229 steam vessels, of which 175 were of iron, with an aggregate tonnage of 67,575. In 1857 there were 921 steam vessels, of 262,786 tons, and 232 vessels were built and registered, of which the tonnage was 172,656, and there were 67 foreign-built vessels, tonnage 11,384.
registered at various ports 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 14,061. There were 754 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 1856 there were entered with cargoes (in ballast are omitted) 156,506 British vessels, tonnage 53,489; there were cleared, likewise with cargoes, in the same period, 156,006 British vessels, tonnage 15,288,329, and 370 foreign vessels, tonnage 55,555. For the United Kingdom there entered 157,706, vessels, tonnage 131,744, and cleared 131,744, sailing vessels, and 24,735 steamers. The foreign sailing vessels entered numbered 288, the steamers 19; the number cleared was 315 sailing vessels, and 29 steamers.

In 1857 the number of British ships, including sailing vessels and steamers, entered inwards with cargoes, was 18,091, the tonnage 6,418,090; the foreign vessels, 13,602, tonnage 3,314,090. Cleared outwards, there were 24,834 British vessels, tonnage 6,204,198; the foreign vessels 10,4, tonnage 3,356,201. The number of ships in ballast is not stated. Of the ships entered inwards Norway and Denmark still have the greatest number, Norway 2080, and Denmark 2311, while the United States sent out only 561 vessels, more than 2500, and Great Britain 1363 entered, 1,214,464, a decrease of 164,167 tons. But though France only entered inwards 1122 ships, tonnage 90,038, she cleared out 4410 vessels, tonnage 473,589; Denmark cleared out 3141 ships, tonnage 316,625; Norway cleared out 2995 ships, tonnage 379,078; and the United States, 1292 ships, tonnage 1,296,934. The number of ships employed in the Coasting Trade was 129,401 entered inwards, tonnage 12,979,069, of which 316 were foreign vessels, tonnage 68,619; cleared outwards, 144,836 vessels, tonnage 14,098,429, of which 247 were foreign vessels, tonnage 434,114.

Currency. At Michaelmas, 1837, the amount of Bank of England notes and post bills in circulation, was 17,096,610l; the value of coin and bullion in hand was 3,656,415l. The amount of the notes of the Bank of England, joint stock banks of England and Wales was 10,142,049l; of which 3,701,996l were those of Private Banks, and 3,440,034l those of Joint Stock Banks. In the year gold to the value of 1,233,688l, silver to that of 78,111l, and copper to that of 90,961l, had been coined. In July, 1844, Sir R. Peel's Bank Restriction Act (7 & 8 Vict. cap. 32) was passed for regulating the issue of paper money. By this act, the Banking Department of the Bank of England was separated from the Bank itself, and the Bank was allowed to supply the deficiency of the currency, subject to a limit of 14,000,000l, to be taken by the Issue Department as security for a like amount of notes, and any further supply could only be obtained by a deposit of the value in bullion, and the return of the notes to an equal amount. The bullion to be valued either in receipt or payment at 37 17s. 9d. per oz., at which rate all persons may demand notes for bullion from the Bank of England. Private Banks, not previously noting such notes, were restricted from commencing, and those which had done so, were prescribed as to the amount to be issued, and were required to furnish returns monthly. Bankers ceasing to issue were not allowed to resume, at the Bank of England, under certain regulations, but were not allowed to issue anything but their own private millions by an amount not more than two-thirds of the private issue that had been discontinued. On January 4, 1845, the amount of notes issued to the Bank of England was 28,087,054l, of which 8,168,125l remained in possession; and the bullion in both departments amounted to 14,801,621l. The notes of Private Banks in England amounted to 4,277,117l, of Joint Stock Banks to 559,493l, of the various banks of Scotland to 3,135,401l, and of the various banks of Ireland to 21,452l. The highest point of the current monetary pressure was experienced, and on October 3, the temporary suspension of the Act was ordered by the First Lord of the Treasury and the Chancellor of the Exchequer (Lord John Russell and Sir G. Canning). The suspension for four months had severally been 37 days, and the resumption of the suspension relieved the pressure, and the order was withdrawn on November 23. The act worked smoothly until the American failures, in the autumn of 1857, occasioned a pressure in the United Kingdom. The rate of discount was rapidly raised to 10 per cent., and on November 12 the restriction was again suspended. An issue of 2,000 notes at 10 per cent. were issued, was sufficient to restore confidence, and by February, 1858, money had sunk to its ordinary value. We subjoin the following returns to show the contrast. On November 11 the notes issued to the Bank of England amounted to 21,051,063l, and those in circulation to 20,183,324l; so that there only remained 957,711l in notes in its coffers; and the amount of bullion was reduced to 7,110,908l. In the return for November 18, the additional issue of the two millions was included; the notes quartered amounted to 22,654,653l, those in circulation to 21,406,410l; the notes unemployed to 1,148,185l; while the bullion had sunk to 6,484,096l. The note issue of the Private and Joint Stock Banks varied but little during this period. The two millions were returned by the Bank of England and the Issue Department by December 30, and on February 17 the notes from the Issue Department amounted to 31,294,810l; those in circulation to 19,453,614l; those unemployed to 341,930l; and the bullion to 17,823,251l.

The coinage, particularly that of gold, has been very large for several years. The following are the amounts of each description of metal for the respective years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1846</td>
<td>£2,334,597</td>
<td>£559,548</td>
<td>£260,082</td>
</tr>
<tr>
<td>1847</td>
<td>£3,019,400</td>
<td>£642,157</td>
<td>£296,082</td>
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<tr>
<td>1848</td>
<td>£2,461,998</td>
<td>£634,544</td>
<td>£269,082</td>
</tr>
<tr>
<td>1849</td>
<td>£1,977,355</td>
<td>£519,636</td>
<td>£179,082</td>
</tr>
<tr>
<td>1850</td>
<td>£1,865,653</td>
<td>£454,917</td>
<td>£168,082</td>
</tr>
<tr>
<td>1851</td>
<td>£4,401,411</td>
<td>£876,866</td>
<td>£335,082</td>
</tr>
<tr>
<td>1852</td>
<td>£8,742,276</td>
<td>£859,504</td>
<td>£388,082</td>
</tr>
<tr>
<td>1853</td>
<td>£11,912,391</td>
<td>£701,544</td>
<td>£407,082</td>
</tr>
<tr>
<td>1854</td>
<td>£4,112,182</td>
<td>£139,480</td>
<td>£613,082</td>
</tr>
<tr>
<td>1855</td>
<td>£9,086,663</td>
<td>£189,511</td>
<td>£635,082</td>
</tr>
<tr>
<td>1856</td>
<td>£6,601,115</td>
<td>£462,528</td>
<td>£11,418</td>
</tr>
</tbody>
</table>

Commercial bills form a large part of the Currency of the kingdom; the average amount held under discount by the Bank of England is about 16,000,000l; those discount by depositors is about 16,000,000l. In the commercial panic, beginning in America, caused the rate of discount to rise from 6l per cent. in July, by rapid steps, to 10 per cent. for a few weeks. By February, 1858, the rate of discount had fallen to 3 per cent. The value of the gold and silver bullion exported in 1857 was 33,566,984l; of which 15,061,995l was in gold, and 18,504,989l in silver. Of the gross sum 10,833,916l. In gold, and 40,901,92l in silver, were remitted to the Bank of England. The Bank of England received a total of 935,686l, the greatest amount in gold; and the United States, 859,110l, all but 15,980l in gold.

TRANSPORTATION. [SERVITUDE, PEKUL, S. J.]

TRAYNIK. [BOYNIK.]

TREE-ERN. [CATH ERA, S. I.]

TRIADONOD. [SQUALIDUS.]

TRIAXIS. [SQUALIDUS.]

TRILICHOES. [SQUALIDUS.]

TRILLACIES. [SQUALIDUS.]

TRILLACIES, the natural order of Plants belonging to the class Diitocygnaceae. They are distinguished by their bisexual tripetaloid flowers, half-consolidated carpels, and axile placentae. Lindey gives the relations of this order with Simencaceae, Roscofgeaceae, Cynanaceae, and Melanchaceae. It contains 4 genera—Poraria, Denticula, Trillium, and Medeola. The species are found in thickets in the temperate parts of Europe, Asia, and North America.

TRIPLODEMA, a genus of Plants belonging to the natural order Stylariales, of a peculiar suborder Pupilionaceae. The species are natives of warm climates, and yield the Rose-Wood of commerce.

TRITIEN, FREDERICK HENRY, a distinguished German and Russian scholar, was born in February 1820 in Switzerland, and educated in Moscow, where at 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

4 U
modern languages, of which French, English, and German were as familiar to him as Russian. He had carried on his studies, and took his degree 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 returned to England, and, from 1824 to 1831, was teacher of modern languages at Rugby, under Dr. Tait, the present bishop of London. He then began to contribute articles, chiefly on subjects connected with Sanscrit literature, to the 'Penny Cyclopedia' and the 'Quarterly Journal 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 Slavonic and Eastern Armenian libraries, in which languages a large stock had then recently been added to the Museum library. In coming to the Museum, he had indulged in expectations that its 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 futile. He accepted in 1845 the post of private tutor in the family of Prince Chernischew, the Russian minister of war, and went to Russia. Peterborough, where he returned to England after an absence of about two years, part of which he had passed at Constantinople and Cairo, and in 1848 published at London an edition of the 'Maha Vira Charita,' or the 'Great Hero's Tale,' in Sanscrit. His friends suggested to him to offer himself as a candidate for the professorship of modern European languages in the Taylor Institution at Oxford, which was then on the point of being set in motion. 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 £400, a sum which in those days was a considerable one. Dr. Trithen, who had already post in 1848 in preference to some very able competitors, 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 Philological 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 attack of fever, and he came to England, where, in 1841, he 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 given him the coldly contemptuous answer that he had he previous occasions been remarked in his conduct. His father came to England, and in 1851 removed him to Odessa, 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, but among his biographers theDictionary and Cyclopedia and Dictionary are of a sound, and solid character, and his scholarship was not only accurate but remarkably ready. The power which he possessed of conversing with ease and in more than one of the Teutonic, the Romanic, and the Slavonic languages qualified him in an eminent degree for the professorship to which he was chosen.

TRIDRACEA. Tillandsia, a small natural order of plants belonging to Linnaeus's class of Monocotyledons. They have the diotygenous structure, unisexual flowers, a soft and rather friable substance known as calyculin, and numerous 1-seeded carpels. There are only two genera, Triginta and Peltophyllum. The species of these plants were first correctly described by Mr. Miers and Mr. Gardner in the woods of Brazil, where they are seen in great numbers in the long- held relations are with Scillastrum, Mentispermaceae, and Tritricaceae. 

TRIOSTIE. [MINERALOGY, S. 1.]

TROY. Thomas Wilde, First Lord, the son of a respectable solicitor in Warwick-square, London, and Safron Walden, Essex, was born in 1832, and received his early education at the London Grammar School. He was articled to a clerk in his father's office, and having been admitted an attorney in 1858, practised for some years as a partner in the firm of Wilde and Knight, in Castle-street, Finsbury-square. In 1857 he was called to the bar, and went the Western Circuit. He was successively appointed attention to his profession, and in 1861, was engaged as a junior in the defence of Queen Caroline, which tended materially to increase his professional reputation, though it retarded his advancement during the reign of George IV. In 1831 he was elected member for Newmarket, against the influence of the late Duke of Newcastle, and, though thrown out in December 1822, he regained his seat in January 1835, and retained it, as colleague with Mr. W. E. Gladstone, until 1841, when he was elected for Worcester. In 1839 he succeeded Sir M. R. Bowes, now Lord Crathorne, to the seat of Hayburn-le-Moor, which had been vacant since 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 a Baronet, and placed in the place of Mr. N. Tindal. In July 1860 he received 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 remarkable cases in which he was professionally engaged, and 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 retainer, and obtained a verdict of 'ho not guilty.' In Parliament his name is most permanently connected with the great case 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 proceedings in the courts of law. On this question Sir Thomas Wilde took the affirmative side, and supported it by a speech of more than three hours' duration, which Dr. Lushington pronounced to be 'the most consummate and learned speech that had been heard in the House.' The matter at issue, as is well known, was eventually compromised by the introduction of a bill by Lord John Russell, formally conferring upon the House that power which it had been claimed in right of Parliament had on the monarchy. The leading speech of Sir Thomas Wilde stood high: he was patient, painstaking, and impartial in the highest degree. As Lord chancellor, his judgments were regarded with respect; and though most of the cases brought before him were appeals from the vice-chancellors' courts, whose decisions were frequently reversed, yet, of his own decisions as a judge only one was reversed on appeal. The chief fault laid to his charge as lord chancellor was an over-anxious and too elaborate dwelling on all the points in an argument, without due regard to their relative importance. Among other important public questions which were decided by him in this capacity was that of the Baptist church-rates. Lord Truro was also eminent as a legal reformer. Whilst holding the office of Lord chancellor he carried through the Commons and Lords a bill which applied the jurisdiction, pleading, and practice of the court, the result of which was that a bill was introduced and carried for the abolition of the twelve masterships, a step which reduced the annual fees of the court by 20,000l. By another and almost permanently-legislative power, some other offices were consolidated or abolished, and the practice of receiving fees by various individuals was suppressed to such an extent that the estimated saving to suitors is 60,000l. a-year. Among the other legal reforms effected by Lord Truro was the appointment of a collector of some of his judicial labours, and so to enable him to give his attention to his duties in the House of Lords, and as a member of the Cabinet without interruption to the law, the office of solicitor to the House, which is connected with the Common Law procedure, the professor object of which is to sweep away the antiquated technicalities upon which
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 is more fully explained in Finlayson's "Summary of the Common Law Procedure Act," 1834.

Lord Truro was twice married: his second wife, who survives him, was Madamiselle Augusta Emma d'Este, daughter of H.R.H. the late Duke of Sussex. He died at his residence, Ebenezer Middlesex, on the 11th of November 1838, and was buried by the side of the late Sir Augustus d'Este, in the Old Minster Chapel at Ramsgate.

TRUSTEES. Owing to the inadequacy of the existing law in this respect, and the desire to make provision for the care and management of the property of others, a statute was passed in 1857 (20 & 21 Vict. c. 54) whereby the following obligations 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 intrusted to him for safe custody.

3. The appointment of 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 any purpose, money may be claimed for its use.

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, omitting to make any entry, to carry, or to direct to be made a full and true entry thereof in the books and accounts of such body corporate or public company.

6. Any director, manager, public officer, or member of any company, by any act of which it is known or believed, for the purpose of defrauding, destroys, alters, mutilates, or falsifies any of the books, papers, writings, or securities belonging to it, or makes, or concurs in the making of any false entry or any material omission in any book of account or other document.

7. Any director, manager, public officer, or member of any company, by any act of which it is known or believed, for the purpose of defrauding, destroys, alters, mutilates, or falsifies any of the books, papers, writings, or securities belonging to it, or makes, or concurs in the making of any false entry or any material omission in any book of account or other document.

8. Any director, manager, public officer, or member of any company, by any act of which it is known or believed, for the purpose of defrauding, destroys, alters, mutilates, or falsifies any of the books, papers, writings, or securities belonging to it, or makes, or concurs in the making of any false entry or any material omission in any book of account or other document.

9. Any director, manager, public officer, or member of any company, by any act of which it is known or believed, for the purpose of defrauding, destroys, alters, mutilates, or falsifies any of the books, papers, writings, or securities belonging to it, or makes, or concurs in the making of any false entry or any material omission in any book of account or other document.

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TRUSTS, CHARITABLE. The sovren, as parents 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, and, thereon, the General's Act (52 Geo. III. c. 101) was passed, to provide 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, to bring an information in Chancery praying such relief as the nature of the law might require; and it was directed that such petition should be heard in a summary way upon affidavit, or such other evidence as should be procted, 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 36 volumes, form a valuable collection of information on the subject of existing charities. Additional powers were given by the statute 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 and Private Laws Acts, 1887, 1888.' The Charity Commissioners for England and Wales, who are 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 that sum, the Master of the Rolls and the Vice-Chancellor 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 in cases of bankruptcy and to the county court or district court in cases where the charity is situated. The decision of any district court of bankruptcy or county court may, however, be brought by the commissioners before a judge of the Court of Chancery, for re-consideration. [COUNTY COURTS, S. 2.] Application may be made to 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 the courts are to proceed from entertaining any legal proceedings (except ex officio proceedings of the Attorney-General) unless upon the certificate of the board, the first proceeding is, in almost all cases, to communicate with that board and obtain its sanction and advice. The powers of the Charity Commissioners by the Act of 1882 are made of extraneous information on the board 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 Attorney Commissioners must be annually laid before Parliament. (Blackst. 'Comm.,' Mr. Kerr's edition, v. ill., p. 483.)

TRYPHILINE [MINERALOGY, S. 1.] TRYUMMUS. TURKISH. The Turkish Empire is divided into Eylaths or general governments, each administered by a pasha, who is generally styled Veli, or vice-roy. The Eylaths are divided into Livas, governed by Kaimakans, or lieutenant-governors. The pashas are subdivided into districts, and these again into Nahiges, or communes, containing villages and hamlets.

Turkey in Europe contains 15 Eylaths, divided into 43 Livas, and 376 Casas. Turkey in Asia is divided into 18 Eylaths, 78 Livas, and 86 Casas; Turkey in Africa into 3 Eylaths, 17 Livas, and 86 Casas. The following table gives the names of the Eylaths, with the chief town of each, extracted from M. Uboini's recent work upon Turkey:
A general estimate of the population in 1844 made the inhabitants amount in round numbers to 35,560,000, distributed as follows among the great popular divisions of the empire:

<table>
<thead>
<tr>
<th>Region</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
</tr>
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<tr>
<td>Asia Minor</td>
<td>10,700,000</td>
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</tr>
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<td>Tripol, Fez, Tunis</td>
<td>1,800,000</td>
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<td>1,800,000</td>
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<tr>
<td>Total</td>
<td>21,900,000</td>
<td>600,000</td>
<td>1,800,000</td>
<td>26,300,000</td>
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</table>

The numbers of the different races of which the population is composed are given as follows:

<table>
<thead>
<tr>
<th>Race</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
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</thead>
<tbody>
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<td>Copts</td>
<td>2,100,000</td>
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<td>2,100,000</td>
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<tr>
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<tr>
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<td>70,000</td>
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<tr>
<td>Slavs</td>
<td>6,200,000</td>
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<tr>
<td>Albanians</td>
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<td></td>
<td>1,500,000</td>
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<tr>
<td>Turks</td>
<td>15,000</td>
<td></td>
<td></td>
<td>15,000</td>
</tr>
<tr>
<td>Assyrians</td>
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<td></td>
<td>9,000</td>
</tr>
<tr>
<td>Syriacs</td>
<td>200,000</td>
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<td></td>
<td>200,000</td>
</tr>
<tr>
<td>Druzes</td>
<td>80,000</td>
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<td>80,000</td>
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<tr>
<td>Kurds</td>
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<td></td>
<td></td>
<td>1,000,000</td>
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<tr>
<td>Greeks</td>
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<td>214,000</td>
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<tr>
<td>Total</td>
<td>15,500,000</td>
<td>16,000,000</td>
<td>3,800,000</td>
<td>35,300,000</td>
</tr>
</tbody>
</table>

With regard to religion the classification is as follows:

<table>
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<th>Religion</th>
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<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
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</thead>
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<tr>
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<td></td>
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<td>60,000</td>
<td></td>
<td>130,000</td>
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<td>Different Sects</td>
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<td>300,000</td>
<td></td>
<td>300,000</td>
</tr>
<tr>
<td>Total</td>
<td>15,900,000</td>
<td>15,900,000</td>
<td>3,800,000</td>
<td>35,600,000</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 300,000 are in Europe, 560,000 in Asia, and 360,000 are in Africa.

With regard to the administrative division of the empire it must be observed that neither the cylists nor the sanjaks, or lives, have such invariable limits as provinces in Europe usually have: and regard to the population, it is obvious that, deducting the powers kept over the tributary but almost independent states of Servia, Moldavia, Wallachia, Egypt, Tripoli, and Tunis, the inhabitants subject to the Porte do not much exceed 26 millions.

Abdul Medjid, son of Mahmud II, ascended the throne of Osman in 1839, in his 16th year. The loss of the battle of Nezib, the treachery of the Cepadan pasha, 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 15, 1840), in fulfilment of which an Austrian-English fleet bombarded and took Acre, Sidon, 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 Syria to the Porte, and the recognition of Mehemet Ali as hereditary pasha of Egypt and its dependencies, upon payment of an annual tribute.

On the death of Mahmud II., the old Turkish party, opposed to all innovations, and especially to all imitations of the polity of Christian states, hoped that no more would be heard of reform. But their hopes were blasted by the appearance of the Hattishef of Galhacid, dated Nov. 3, 1839, and countersigned by Resheid Pasha, which contained guarantees for the life, property, and honour of all the subjects of the Sultan, irrespective of person or religion, and which reformed the system of recruiting, and the introduction of an impartial system of taxation. The issue of this charter threw the empire into commotion; the old Turks, headed by Risa Pasha in the capital (who was accused of being under the influence of Russia), made a formidable opposition to the execution of the decree; the Turkish subjects of the Sultan, brought up in principles of ascendancy and contempt for Christianity, rose in insurrection to defend their privileges. To this class of the subjects of the Sultan in that part of the empire, long groaning under oppression, were accustomeds and taught to look to protection and deliverance to Russia. France had to interpose frequently (but more or less covertly) to protect the Hattishef of Galhacid, and to prevent the fall of the Porte; and the English and Austrian ambassadors at the Sublime Porte embraced every opportunity of keeping up the influence of their several governments. Thus, not only did the foreign nations interfere in the domestic affairs of the empire, but their ambassadors seemed to be set of players with Turkey for a chessboard. The execution and firm establishment of the system mooted by the Hattishef, would have put an end to this state of things. The Christian subjects of the Porte, who were suffering from the protection of law, and depriving them of all excuse and desire for seeking foreign protection. Russia could never coax a people to take shelter behind her shield who lived secure under theegis of law. The Sultan’s government, it is true, has given many indications of persevering reform, and has issued many orders in furtherance of the system (among others one in 1855 for the reception of Christian evidence in the courts of justice), but the fact is undeniable, that the central government is not able to cope in the present state of things with the demand of the Christian population of the empire. A fine instance of the noble generosity that lies at the bottom of the Turkish character was exhibited to the world in the refusal of the Sultan Abdu-l-Medjid to surrender his subject Maximilian for execution to the imperial sovereign of France and Russia in 1849. Nevertheless the influence of Russia, however it might diminish at court, was rapidly extending among the Christian population of the empire. Indeed, for the mere terms of the treaties of Kainari, Adrianopole, Unkerm-Sokolow, it is clear that the Porte has driven the nose of political dependence closer and tighter near the neck of Turkey. The crisis seemed to arrive, when 1853 the Czar Nicholas, through his minister Menszik 2 diverted opened the protectorate of the Porte over the Obero of the Sultan, threw the right to adjudicate in certain cases of dispute; and insolently occupied Moldavia and Wallachia, as a ‘martial guarantee’ for compliance with his demands. In consequence of this, a Turkish war was under Omar Pasha occupied the Balkan and the fortress of the Danube; and French and English fleets cast anchor in Besika Bay. In October following the Porte declared war against Russia, and appealed to France and England for aid. In the campaign that followed in Little Wallachia and Unkerm-Sokolow, the Porte was completely defeated, but in November the Russian fleet, issuing from the harbour of Sevastopol, attacked and utterly destroyed the Turkish fleet in the roads of Sinope. In the following March the Porte was compelled to evacuate the Dobrudja; and about the same time England and France declared war, and the fleets entered the Black Sea. On the 15th of June the Russians, after great efforts and vast loss of men, raised the siege of Sinopia (French and English armies now appearing in Turkey, encompassed the army of Varna), and retreated across the Danube. The Turks crossed the Danube. The Russians were defeated at Giurgevo, and soon after evacuated the principality which, in accordance with the terms of a treaty with the Porte, were occupied by Austrian forces. Meanwhile the French and English fleets entered the Black Sea, bombarded Odessa, and forced the Russian fleet to take refuge in the harbour of Sevastopol. An Anglo-French army landed on September 14, 1854, under the command of Marshal St. Arnaud and Lord Raglan. The battle of Alma followed on the 20th, in which the Russians under Prince Menszikoff were utterly defeated by the allies, the road was open to Sevastopol. To secure ready occupation of the city, another army was sent by a flank march, seized upon the harbours of Balaklava and Kamiesch, and the southern side of Sevastopol was invested on the 26th of September, the Russians having, in 3 days, by sinking several warships, barricaded the entrance by sea to this great town, and military arsenal. Here, on the dreary heights of Sevastopol, throughout the terrible winter of 1854–5, allies maintained the hard struggle and obstinate the Turks, with a skilful force within and a considerable body without, humbling the name and prestige of Russia by
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 defeat never, and of victory more than he had expected, least of all which was the victory of Tchernaya, August 16, in which the Sardinians, then numbered among the allies, fought with great skill and courage; until at last, after a long bombardment, the Malakoff fortress on the 8th of S.t-George, and the allied fleet took Scutari.

TURNER, JOSEPH MALLOLD WILLIAM, was born on Nov. 26, Maidue-lane, Covent Garden, where his father carried on business as a hair dresser. The year, as well as the name of his father, is given in the name of two of his pictures, and that is certainly known respecting either is, that his baptism 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. His first real education was his primary training in art, or what led him to think of painting, and it was that which gave him the precise information. Probably his own strong inclination first stimulated him to overcome the initiatory difficulties of the study of drawing, and some casual occurrence or accident occasioned the beginning of his study. There were never any such accidents that appear that the elder Turner thwarted his son's inclination, though, perhaps from poverty, perhaps from indigence, he did not procure him the instruction which might have smoothed his early path.

Turner's 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 standing in the same relation to this art as Rembrandt to painting, and Rubens to his; as much may be gained by the advancement of one branch of industry, if accompanied by perseverance, without 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 a patient perseverance, he has overcome all the difficulties of the art." (Davy's "Professional Sketches of Modern Artists," Works, p. 352.)

This passage was written by one eminent in his day as an inducement to Turner to try his fair influence upon the young artist, and to advise him to avail himself of the friend of Girtin, Turner's earliest and closest artistic associate, and it coincides with what other authorities, both written and traditionary, have always related of his career. But from the year 1789 to 1798 when he opened to him the means of obtaining professional knowledge, he 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 schools, or 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 like that a young artist such 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 at the earliest furthest he obtained from those masterpieces of art—fields and Dr. Monro's work—Dr. Monro, who 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 proteges, Girtin and Turner, free access to these 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 from twelve to twenty guineas. In these sketching rambles, Turner and Girtin wandered together, 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 good colourist, who in his time is said to have painted not less than two thousand pictures, "the possession much 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 the same day that Turner had been born, and was consequently thirty-four years older than him, and had passed at 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.

Two 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 "J. W. Turner") with his pictures "A Sunset on the Thames," and "Wanstead House:" his next appearance being 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 1849, sending in all 259 pictures, a very large proportion of them being paintings of considerable magnitude. But these alone are not the works which give a very inadequate notion of his remarkable facility in art as a painter of small pictures. 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 remained unsold at all, besides the hundreds of water-colour drawings and designs 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," and "The Fifth of November," 1805, being confined to the representation of English and Welsh scenery. But already it was felt that there was a degree of brilliancy of execution united with close observation of nature which was none of the qualities of any of his contemporaries, and justified the highest anticipations of his future success. The popular opinion received professional confirmation by his election in 1799 as an associate of the Royal Academy; in 1802 he became an academician. He now visited Scotland, France, Switzerland, and the Rhine; launched boldly into oil painting on canvases of large size, and began to look into the Greek and Roman poets—or their substitute Lemperrie—for subjects for his pencil. This year, 1802, the exhibition afforded many fine specimens of vivid colour, and high finish. Turner was taking his contributions being "The Falls of the Clyde;" "Kilsburn Castle;" "Edinburgh from the Water of Leith;" "Ben Lomond Mountains—the Traveler;" "The Housetoun;" "The Storm;" "A Shieling Man in a Sea-Shore in Squally Weather;" and "Ships bearing up for Anchorage." He evidently felt his strength; yet year after year, while showing himself sufficiently conscious that he knew his proper walk, he kept on putting forth strange experiments in subjects and methods: thus one year (1803) saw his "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 Garrick's Petticoat" but even from these strange whims he seemed to gather new strength. At this time however he appears to have studied with most earnestness the stormy ocean, and never yet has the sea in its most agitated and most picturesque aspects been more the subject of artists. He delighted in the poetical treatment of views of places, such as his "Edinburgh from Calton Hill," 1804; "Fall of the Rhine at Schaffhausen," 1808, and "Sun Rising through Vapour," 1806, not only enabling him to paint his pictures to great advantage, but perhaps even to wider popularity, while with the connoisseurs his "Narcissus and Echo," 1814, "Mercury and Herse," and "Apollo and Python," 1811, his "Dido and Aeneas," "Apollo, and a long list of other subjects, all6h as his first views of the noble and mighty and grand in his noble "Shipwreck: Fishing-boats endeavouring to rescue the Crew," now at Marlborough house; the "Gale at Sea," belonging to the Earl of Eglcumere; and the "Wreck of the Minotaur," the property of Lord Yarborough. But even alongside of these he continued to paint his "Sunset" themes, and was made a baronet in 1809 for his services in the navy, and in 1811 admitted to the Society of Young Artists. These were the years of his greatest triumphs, and although his pictures have not at all times been the same, yet they are the works which are most generally admired, and which have given him so much fame. As a water-colour painter, he was equal to very few of the French or English artists; and as a painter of marine subjects, he has been unfailing in his excellence. He has shewn a vivid fancy, a great and prodigious fertility of invention, a strong love for the picturesque, an accurate observation of nature, a indefatigable perseverance, and a great taste for invention and composition.
purely imaginative productions of this period, 'snow-storm—
Hannibal crossing the Alps,' and the like, in which he
almost for the first time portrayed with some approach
to the vastness and sublimity of nature the fierce encounter
of the elements, the splendour of the rarer phenomena of
the atmosphere, and the beauty and glory of the moun-
tains.
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, an honour in which he
took pride. The landscape schools of the past were not
entirely abandoned 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 no copy of them is left. Report has always spoken of them however as ill-arranged
and ill-delivered, confused in style, and obscure in illustrate.
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 under-
taken in rivalry of the book of sketches known as the
'Liber Veritatis' of Claude, in the possession of the Duke of
Devonshire, of which a series of fac-simile aqua-tinta
engravings was made by Earlom and others. Turner's
series, engraved in a similar style, some of them by Turner
himself, is regarded as the principal example 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. Turner had been long extremely rare, and when brought to sale comprised a high
completeness. Two republishations of it have been announced.
From this time to his death Turner remained the most in
request with publishers and engravers of any English land-
scape-painter, both for the landscape illustrations of books and for series of engravings; and even where his 'econ-
tricities of colour,' as they are called, repel, his engraved designs are few with exceptions received with unmitigated
delight. Among the most famous of these engraved works may be mentioned the 'Scenery of the southern Coast
of 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 notable line-
engravings of large size have been made by Fye, Willmore,
Miller, Prior, &c., while Turner's grand engraving of 'The
Shipwreck' is one of the richest specimens of mezzotinto.
It can hardly be a stretch like this trace the progress of the
painter by the truly impertinent dogmatic record of his life—the production of his chief pictures. He made three
visits to Italy in 1819, 1829, and 1840, and after each his style underwent a remarkable change. The usual division
of his life into three periods is therefore applicable to him. It does not however exactly coincide with his Italian visits. Tur-
ner's career, it is said, comprises three distinct periods; the first reaches to about his twenty-seventh year, when he was
elected to the Academy, and during which he was chiefly
notable 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, Louthiersburg,
and others. The second, or period thorough-going, works is very apparent in his earliest oil-paintings: the second
period ranges from 1802 to 1830, in which he is seen first a follower of Claude, and, in a less degree, of
Gaspar Poussin, but rapidly disowning himself from the
trammels of every kind of pupilage to great names, and
striking out a style of landscape-painting entirely
original and wholly unrivalled for brilliancy of colouring
and effect: while the third period, dating from his second
visit to Italy and his return in which he, with the
opportunity, sacrificed in the effort to attain the utmost splendour of
light and colour—to make in (the strange language of his
own 'MS. Falacies of Hope')

' the air
Exhale earth's humid bubbles, and, emulsion of light,
Reflect her forms in each prismatic guise.'

But while such a division is convenient it must not be re-
garded 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
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 up to some ten or twelve
years before his death, his knowledge of the phenomena of
the atmosphere, and his perception of the resources of
his art, were rapidly expanding, even when his hand failed to express faithfully his intentions, or his impatience prevented him setting
forth with due elaboration. Any one who has carefully
studied Turner's works, especially in the last time, will
find that, at the same time diligently studied nature, will sympathise if he
cannot entirely concur in the strong statement of Turner's
most ardent admirer, Ruskin:—"There has been marked
and constant progress in his mind; he has not been, like
some other artists, a man who worked by instinct alone;
what he has been as evidently as it has been swiftly progressive,
and in different stages of the struggle, sometimes one ordre of
time, sometimes another, has been aimed at or omitted.

As he advanced, the previous knowledge or
attainment 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 and knows too much,
and has too little time to say it in, in pause for expression, or
pander over his syllables." ('Modern Painters,' i. 407.)

It would be easy to refer to examples illustrative of
Turner's different periods, but so large a number of his
pictures is now possessed by rich private collectors, by
museums, and by the public, that particular examples of
his works, with the exception of a few in the artist's private
collection, and of the other examples of Turner's pencil in
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 to the galleries of additional
unusual phenomena by maltreatment, which has been
for the purpose. Turner in fact seems never to have
understood the limits of his art, and in seeking to accom-
plish what is impracticable with such means as he possessed,
and with such necessarily imperfect skill, he became extra-
vagant and bizarre. Although eccentricity 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 of his life, when he seems to have been incapable 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 belong some
of his best oils, and that his most perfect landscapes
valued powers as a landscape-painter are seen in their
fullest development, his 'Child's Harold, or Modern Italy,'
(now at Marlborough House) which was painted in 1832;
and to this period also belong some of his most poetic
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 in Chelsea, of consumption, on the 6th of a
river-side at Chelsea. He was buried with some state
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 coarseness and love
of money: but they bear on their face a coloured and ex-
aggerated character. It is certain that he had hoarded
his money for no selfish purpose. For many years he had
lived in poverty, but, with his usual vision, he secured
the best pictures, and when any such, painted and sold in his own name or for sale, he if 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,
'the family library and picture gallery.' With a suitable gallery was 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 compo-

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mixed by the engravings and the other property being transferred to the next of kin, with the dispute of the will, while the paintings and drawings were held by the nation. The oil paintings, 100 hundred in number, include many of his finest works as well as a number of portraits and landscapes painted by Mr. Ruskin, who volunteered his services to the government; and a choice selection of them is now hung on the gallery at Marlborough-House. Among those now exhibited are a number of the drawings, oil and watercolors, and numerous sepia drawings made for the 'Liber Studiorum,' the Rivers, &c., some 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 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 of either his own or an earlier time. But as his style is not confined to a single subject, it is only fair 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. Wagner says—'The power of Turner is, of course, the result of a rare combination of qualities, a power to show things and not mere names; to place them in their relations with one another, to estheticize, to harmonize; a power that seems to result only from a profound penetration into the nature of things. He has a gift for place and for time, that is the secret of his success.'

His local descriptions exhibit the most exquisite feeling for beauty of lines and effect of lighting: at the same time he has the power of making the figures fit in properly; his art is not confined to the picturesque, but is as applicable to the actual as to the ideal, and the result is that his reputation rests only on his work, and he had 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 1848. This work, which has been in progress for a number of years, is on this work that his reputation chiefly rests. He was the first English author who had taken the pains, or had had sufficient knowledge, to investigate the valuable remains left to us in Anglo-Saxon records. He consulted the original manuscripts with great industry and intelligence, and the result has been that, though his views have been more than once assailed, they have generally sustained the test of time. It is a matter of which is more than once believed that the study of Saxon literature has been made more popular and useful by the smaller and more easily understood. The work soon took 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 three separate volumes, the last of which was published in 1854. This work, as presented in the 'Archaeological Journal' published between 1848 and 1851, formed the groundwork of his fame. The project for a valuable introduction; the work being presented to the Roxburgh Club by Mr. Beriah Bottfield. After the publication of this volume he was made secretary to the Society of Antiquaries. The advantage of 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 Xlissiana.' On his retirement from this office, he continued his studies, but commenced his work, 'Some Account of Domestic Architecture in England, from the Saxon period to the end of the Thirteenth Century,' which was published in 1855.

This work, and his papers in the 'Archaeological Journal' of 1848 and 1851, formed the groundwork of this leader. The porphyry was made a scarce and expensive commodity, and it is necessary to the student of English antiquities. It does not confine itself to the study of the material remains, but includes the story of the people, their customs, their manners, and their institutions. The study of the material remains, the history of the people, and the customs of the times are all necessary to a complete and accurate knowledge of the subject.
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 executed, and that in a manner but a fragment: at any rate, Mr. Turner promised to carry on 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.

TURTONIA, a genus of Conchiferous Molusca, named by Mr. Hanley after Dr. Turton. There is but one species, T. minute, 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 Molusca.)

TUSCANY. The territory of Lunca fell to Tuscany in 1847.

LUCCA.] The Grand-Duchy is divided into compartments, or provinces, as in the following table:

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Square M.</th>
<th>Population in 1845</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florence</td>
<td>2,426</td>
<td>718,701</td>
</tr>
<tr>
<td>Pisa</td>
<td>510</td>
<td>265,304</td>
</tr>
<tr>
<td>Siena</td>
<td>1,174</td>
<td>231,473</td>
</tr>
<tr>
<td>Anconia</td>
<td>1,151</td>
<td>136,159</td>
</tr>
<tr>
<td>Arezzo</td>
<td>1,265</td>
<td>229,090</td>
</tr>
<tr>
<td>Grosseto</td>
<td>1,710</td>
<td>80,960</td>
</tr>
<tr>
<td>Livorno</td>
<td>38</td>
<td>90,429</td>
</tr>
<tr>
<td>Isle of Elba</td>
<td>96</td>
<td>21,650</td>
</tr>
</tbody>
</table>

Total: 8,494, 1,615,656

TWICKENHAM. [Middlesex.]

TYPHOUS FEVER. [Physic, Prat. 1848, p. 22.]

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 Scotch 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-Justices Clerk of Scotland on a visit to the Continent. His first literary efforts were as contributor to 'Blackwood's Magazine,' but in 1819 was published in Edinburgh an independent work entitled 'Life of James Crichton of Cluny, commonly called Admirable Crichton.' The work reached a second edition in 1823, when an 'Appendix of Original Papers' was added to it. In 1825 he published an edition of the Works 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 1828 by a 'Life of John Winckely,' 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 1829, and the work was completed in nine volumes in 1843. It has since then passed through several editions, and is recognised everywhere as the standard History of Scotland—the only work in which Scotch history is treated at full length on the basis of authentic materials, and in a calm and accurate as distinct from a merely popular manner. It commences with the accession of Alexander III. to the Scotch throne in the 13th century, and brings down the narrative to the Union of the two countries. From the union of the two countries he set out on the work; during this writing, 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., 1831-33; 'Historical View of the Progress of Discovery on the more Northern Coasts of America,' published in Edinburgh in 1832, and recently re-edited in America; 'Life of Sir Walter Raleigh,' 1835; 'Life of Henry the Eighth,' 1837, and 'Life of Oliver and Lord Hertford.' Mr. Tytler and 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 Encyclopedia Britannica, and this work 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 600l. 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 Hydrocharidaceae. A probable species of this genus has been recently introduced into England, and described by Babington under the name of Anacharis alismaturn. The following is his description in the 'Manual of British Botany':—

it has its leaves 3 in a wheel, oval-oblong, obtuse, serrulate (the male flower unknown), the female flower with a tubular bisid spathe, many times longer than the sessile germen: sepals, and petals, broad, nearly equal; stigmas reflexed. The stem is long, branching; whorls of leaves many and close together. Flowers subtended by a leaf-like bract. Flowers: no petals, and no seeds. The sepals tinged with green and pink externally, hooded, with a narrow diaphanous margin. The petals are flat, diaphanous, recurved, and oblong. Filaments at first curved outward, their points placed under the hood of the sepals, afterwards erect, linear, blunt, diaphanous; stigmas recurved, linear, or deeply bisid; 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 Udora Cambdensis 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 pelt-tilliferous 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, to which it has had access.

Anacharis alismaturn is one of those plants in which a circulation can be seen, and has afforded to several observers the means of more closely watching these vegetable movements than any other plant which has yet been observed. It has been inferred by Dr. Brasen and others, that the movements of the cell-contents of this plant are produced by cilia. Mr. Weham however regards this movement as originating in the molecular activity of the protoplasm itself


ULSTER, NEW. [Isle of Man, New, S. 2.]

UMPILY. [Arbitration, 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 26° and 49° N. lat., 67° and 122° 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 stated under Ursula was 81,360 square miles. The greatest width of the United States from east to west is 2900 miles, the greatest length from north to south is 3730 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 2,906,800 square miles. But a more elaborate and careful estimate made by the United States Topographical Bureau, January 1854, reduces the area to 2,836,186 square miles, and if to this be added the additional territory of 27,600 square miles, ceded by Mexico by treaty in July 1854, the total area at the present time will be 2,963,666 square miles. The population in 1850 was 22,191,576, and 7,800 to a square mile: but this does not include the native Indians, who were estimated by the Indian Commissioner in 1853 at 400,764. The following table shows the States and Territories comprised in the United States, 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; Mississippi; Missouri, &c.; the Alleghany, and Rocky Mountains, &c.; and the lakes Erie & Ontario, &c. The total area of the United States, as already stated according to the revised calculations of Colonist Abert, of the United States Topographical Engineers, is 2,906,800 square miles, which he thus apporitions:—Area of the Pacific slope, or of the region watered by rivers falling into the Pacific, 793,702 square miles; the Mississippi Valley, 1,217,602 square miles; and the region whose waters fall into the Atlantic, 955,496 square miles. The number of inhabitants in 1850 was 22,191,576, and 7,800 to a square mile.

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:—

**Territorial Increase of the United States.**

<table>
<thead>
<tr>
<th>Territory</th>
<th>Square Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of the United States at the peace of 1815</td>
<td>819,579</td>
</tr>
<tr>
<td>Purchase of Louisiana from France</td>
<td>1810</td>
</tr>
<tr>
<td>Creation of Florida by Spain</td>
<td>1819</td>
</tr>
<tr>
<td>Admission of Texas [see Texas]</td>
<td>1844</td>
</tr>
<tr>
<td>Territory obtained by Oregon treaty with Great Britain</td>
<td>1846</td>
</tr>
<tr>
<td>Territory ceded by Mexico [see Mexico]</td>
<td>1848</td>
</tr>
</tbody>
</table>

Additional, ceded by Mexico by a new treaty, 1854 |

Total | 2,963,666 |

The total area of the United States at the peace of 1815 was 819,579 square miles. The purchase of Louisiana from France in 1803 was 1810 square miles. The creation of Florida by Spain in 1819 was 1819 square miles. The admission of Texas [see Texas] in 1844 was 318,000 square miles. The territory obtained by Oregon treaty with Great Britain in 1846 was 368,062 square miles. The territory ceded by Mexico [see Mexico] in 1848 was 592,955 square miles. The additional, ceded by Mexico by a new treaty, in 1854 was 27,500 square miles. The total area of the United States is 2,963,666 square miles.
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>Whites</td>
<td>3,172,446</td>
<td>4,019,489</td>
<td>6,924,000</td>
<td>7,657,107</td>
<td>10,377,288</td>
<td>15,500,088</td>
</tr>
<tr>
<td>Free</td>
<td>2,937,116</td>
<td>3,804,041</td>
<td>6,552,197</td>
<td>7,284,785</td>
<td>9,992,405</td>
<td>14,981,923</td>
</tr>
<tr>
<td>Slaves</td>
<td>235,330</td>
<td>205,448</td>
<td>271,803</td>
<td>372,322</td>
<td>484,602</td>
<td>518,165</td>
</tr>
<tr>
<td>Total</td>
<td>3,407,776</td>
<td>4,224,937</td>
<td>7,195,890</td>
<td>8,029,507</td>
<td>10,866,887</td>
<td>15,519,150</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. During the year June 30, 1866, the total imports of the United States amounted to 314,629,942 dollars; the exports to 326,964,908 dollars; of which 310,686,330 dollars were of domestic produce, and 16,578,672 dollars of foreign produce. Of the foreign trade, considerably more than half is with Great Britain and its dependencies. The total amount of tonnage engaged in the foreign trade was 4,671,662. The total number of American vessels entered from foreign countries in 1866 was 10,507, of foreign vessels, 11,176; the clearance of vessels during the same year was on American vessels 10,092, of foreign vessels 11,186. The registered tonnage of the commercial navy was 2,491,403. The crew of American vessels cleared out numbered 152,797 men and 37,913, and distributed generally under the heads of canals 4738 miles; of railways 24,290 miles completed.

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, 1866, amounted to 315,513,961 dollars, of which 63,875,905 dollars were raised by customs duties. The expenditure for the same year was 70,822,724 dollars. Of this 5,943,869 dollars was for interest on and redemption of the public debt, which amounted to 30,263,900 dollars.

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 1849
12. Zachary Taylor (died in office)  1849 1850
13. Millard Fillmore  1850 1853
14. Franklin Pierce  1853 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. Many of the leading causes of these developments have been foreign relations, which have happened and excited much interest, but it does not belong to us to notice more than will be found in America, S. 2; California, S. 2; Oregon, S. 2; Texas, S. 2; Utah, S. 2.

The motion of the solar system in space is directed towards the planet 1863 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 probably made by the observations of the stars of the southern hemisphere which would indicate a motion of the solar system towards the same point as that shown by the northern stars. This laborious task was undertaken by M. Leverrier, who published his results in a memoir published in 1844, in which the catalogue of 172 stars observed at Mr. Henderson at the Cape of Good Hope, with the older determinations of Bradley and Lacaille, he arrived at almost exactly the same conclusion 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 1854, a paper in which the motions of 675 stars observed at Greenwich, in which the accuracy of the investigations of Argelander and Struve was fully established.

The fact of this rapid movement of the entire solar system in space and its great importance in astronomy, while in the higher theoretical branch of the science it is of great importance to astronomers on the consideration of the question whether there does not exist a general centre of gravity, to which is subjected not only our own solar system, but the whole of the stars of the Milky Way. The question is difficult but regarded as of consequence, not least as to a certain extent premature, though by no means so discouraged as forrunners of something more decisive.
ledge was fully stated under Scw. Since that article was written, the spots on the sun have been carefully watched by many skilful observers. The observations and investigations of Dr. Bal in, 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 him the gold medal of the Royal Astronomical Society in 1857. The result of his investigations was thus stated by Dr. Lloyd in his address as president of the British Association, 1857:—"According to the observations of Schwabe, which have been continued without interruption for 20 years, the instantaneous spots on the sun's surface, which are not visible at any instant, increase and decrease periodically, the length of the period being 11 years and 40 days. This remarkable fact and the relation which it appears to have to certain periods of solar activity, add fresh interest to the study of the solar surface; and upon the suggestion of Sir John Herschel, a photobehiographic apparatus has lately been established at Kew for the purpose of depicting the actual molecular state of the sun's surface from time to time."

Of the constitution of the sun itself, little additional knowledge has been acquired. "Towards the close of the last century," observed Dr. Lloyd in the presidential address just quoted, "many hypotheses were advanced regarding the nature and constitution of the sun, all of which are considered as in consistent with the present state of our knowledge of the distance by a luminous envelope. But the only certain fact which has been added to science in this department is the proof given by Arago, that the light of the sun emanated (not reflected) by the telescope, passed through the atmosphere, the light of incandescent solid bodies being polarised by refraction, while the light of the sun, and that emitted by gaseous bodies, is unpolarised."

Next to the sun, the earth's satellite the Moon has, among the heavenly bodies, always engaged the largest share of the attention of man. Observations of the moon's visible surface have from the earliest use of telescopes been diligently prosecuted; and while there has been no falling off of late years among astronomers in seal, there has been a great increase of combinations in resultant light, the instruments they have used have been of a very superior character. Their observations on the moon's surface have recently been directed specially to ascertain whether the old opinion of the existence of lunar seas and a lunar atmosphere was well founded or not. Increased telescope power showed that the supposed ocean beds were full of inequalities, in fact, as described by Professor Phillips, 'the so-called seas, under this more exact scrutiny, appear destitute of water, and the supposed ocean beds are filled in with an indescribable variety of little points and minute craters, or uncoloured long winding ridges of very small elevation'; and though Arago suggested that some of these appearances were not inconsistent with uneven sea-bottoms covered with shallow water, yet the beautiful effects of the moon's surface, visible from great heights, he himself, from these and other optical phenomena, acquired in the belief, now general among astronomers, that water does not exist on the surface of the moon.

The appearance of the moon's surface, when examined through a powerful telescope, has, as is well known, been long represented in very carefully prepared maps, on which all the leading features—mountains, plains, ridges, "rills," and other objects, are indicated by names, which astronomers have agreed to assign them. Such a map will be found under the article Moon. The famous lunar map of Beer and Mädler has carried accuracy and beauty of execution as far as it possibly could be approached; but even these points are surpassed by the comparison of many drawings a surprisingly near approach to it has been made. The most minute and perfect accuracy however is what astronomers always desire in the record of their observations; and hence the beautiful art of photography is an indispensable aid to the delineation of the moon. Mr. Bond, the distinguished American astronomer, was the first who so applied it; but it has since been extensively used in this country. Many difficulties have presented themselves, but by that steady, patient, inventive application which is so characteristic of the astronomer, they have already been to a great extent surmounted. By various ingenious apparatus, including the addition of a clock-work motion to the telescope, and by the employment of extreme magnifications, remarkable beauty have been obtained by Mr. De la Rue and some other gentlemen; and it is probable that the portrait drawn by the Moon herself will to a great degree supersede that of the Moon of Buffon. It has already noticed that the Sun is keeping for the perusal 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 as perfect as those of the Universe. Special studies 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 lightho described in words or depicted in 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 point. The most 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 at the various points of immersion, or appearance behind the moon, and at its emersion, or reappearance. None such has however been observed with the powerful instruments which have been employed for the last century. On the contrary, the illumination and emersion have been instantaneous without 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 production of heat by the light of the moon. Various experiments had at different times been made with a view to determining whether the lunar rays gave out any appreciable warmth, but without success. At length, in 1846, Signor Meloni, 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 destroyed by the most evident 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 1856, on the high grounds of Mount Vesuvius, and placed 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 measured.

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 Gotha and 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 Mssrs. Airy and Hansen would be out of place in a non-mathematical work, but it may be said here that it is considered, as 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 long perplexed astronomers and mathematicians of Europe. The lunar theory is thus considered as divested of all serious embarrassment."

"The discoveries, and the corrections of our previous knowledge, in the world of planets, have been equally grand and surprising. In the order of their discovery, and the correspondence of their occurrence, and all that is mainly of interest to the astronomer and the man of science, we may commence with the extraordinary additions made to the group of small planets which revolve in the wide interval between Mars and Jupiter. The discovery of these planets is to be referred to the month of January 1801, so that our knowledge of the entire group belongs to the present century. By March 1807 four had been discovered. The discovery of this fourth minor planet was made by Olbers, the discoverer of the second of the
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 theory of the nebular planet, its position was conceived and 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 ecliptic the inclined orbit of which was itself vastly inclined, must fall nearly at 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 labour of his other astronomer met with a similar reward, 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—making in all fifty-three, of which forty-nine have been discovered from the 1st of July 1847—and all (at least all 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 conformity of their orbits respecting various other facts. (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 elliptical material 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 planets, being invisible to the naked eye. The diameter of the largest is indeed probably less than half a mile, but it is scarcely necessary to add, that if the whole 53 at present known—and probably more will yet be found—are fragments of one shattered planet, it must have been very large indeed.

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 Pizzighelli
   February 1, 1801.
2. Pallas Galle
   March 29, 1802.
3. Juno Harding
   September 1, 1804.
4. Vesta Olbers
   March 29, 1807.
5. Hygeia Heincke
   December 8, 1802.
6. Hebe Heincke
   July 1, 1847.
7. Iris Hinck
   August 13, 1847.
8. Flora
   October 16, 1847.
9. Egeria Graham
   April 21, 1848.
10. Hygeia
    De Gaspari
    April 31, 1849.
11. Parthenope
    De Gaspari
    May 11, 1859.
12. Victoria
    De Gaspari
    September 13, 1859.
13. Eugenia
    De Gaspari
    November 2, 1859.
14. Iene
    De Gaspari
    May 19, 1859.
15. Eunomia
    De Gaspari
    July 25, 1859.
16. Psyche
    De Gaspari
    March 17, 1859.
17. Thalia
    De Gaspari
    April 17, 1859.
18. Melpomene
    Hamburger
    June 24, 1859.
19. Fortuna
    De Gaspari
    August 22, 1859.
20. Lutetia
    De Gaspari
    September 19, 1859.
21. Callippe
    Hamburger
    November 16, 1859.
22. Phoebe
    Hamburger
    December 15, 1859.
23. Themis
    Hamburger
    April 6, 1863.
24. Proserpine
    Hamburger
    April 6, 1863.
25. Bellona
    Hamburger
    May 5, 1863.
26. Amphitrite
    Hamburger
    March 18, 1863.
27. Urania
    Hamburger
    March 1, 1864.
28. Sophyxone
    Ferguson
    September 15, 1864.
29. Pomona
    Goldschmidt
    October 26, 1864.
30. Polyhymnia
    Goldschmidt
    October 26, 1864.
31. Cebus
    Goldschmidt
    April 6, 1865.
32. Leucotede
    Goldschmidt
    April 6, 1865.
33. Atalanta
    Goldschmidt
    October 5, 1865.
34. Fides
    Goldschmidt
    October 5, 1865.
35. Tellus
    Goldschmidt
    January 2, 1866.
36. Larissa
    Goldschmidt
    February 8, 1866.

The planet Saturn, from the wonderful appendages connected with it, and the general beauty as well as scientific interest which it presents to the astronomer, always has been an object of careful examination and study; and it might well have been supposed that little additional information was attainable respecting its external character, did not every increase of telescope power afford evidence that the field of astronomical discovery is practically inexhaustible. The first of the recent discoveries was made 1846. During the autumn and winter of that year the rings or rings of Saturn disappeared, and astronomers seized the opportunity to observe the planet with great care in order to obtain more minute and accurate admeasurement, with the view of ascertaining with greater precision the divergence, if any, of his diameter from a true ellipse. In the course of this examination Mr. Bond, of Cambridge, Massachusetts, U.S., observed a bright object situated in the region of an eighth satellite of Saturn—but several a distance from the planet. This satellite, to which the name Hyperion has been given, was first seen by Mr. Bond on the 16th of September, 1846; but its true character was not recognized by him till visited by Mr. Lassell on the 18th of September. The sidereal revolution of this satellite round the planet is 21 days 4 hours, 30 minutes, its mean distance in semi-diameters of Saturn being 6,800. The revolutions and mean distances of its other satellites are given under SATURN.

The other discovery—that of an inner dark, dusky, diaphanous ring, lying between the bright ring and the body of the planet, but unattached to either—was made next 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 is of less consequence, as it is certain that the inner ring had been observed by Dr. Galle of Berlin in 1848 and described by Encke in the 'Nachrichten' of Mannheim, though somewhat unaccountably it had been suffered to slip entirely out of 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. Main; and later by Mr. Bond, of a probable division of the external ring. Otto Struve again was 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 both the bright rings is increasing. Mr. Main, however, has set a very large number of admeasurements of the rings with a double-image micrometer, during the years 1859-55, 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 by the discoverer of Uranus, Sir William Herschel; in 1847-48 two, perhaps three, of these satellites were seen by the Struve, and Mr. Lassell; and in November 1851 Mr. Lassell discovered two new 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 5 days, while the first of Herschell'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 could be antecedent to the existence of the planet and the new and yet unknown planet. In the matter of the planet Uranus, certain irregularities had been seen for several
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. The celebrated 19th-century astronomers, Cambridge and Le Verrier of Paris, devoted themselves, unknown to each other, to the task—one of enormous labour, and requiring great skill in the higher mathematics—of arriving by calculation at the source of the perturbation. Each arrived at the conclusion independently and simultaneously 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 in the following communication by both authors, that we may almost judge, free from national other bias. He says, (Communications,' vol. iii., note 640), "Le Verrier at the instance of Arago, began in the summer of 1845, to work at the theory of Uranus. He laid the results of his investigation before the Institute, on the 10th of November 1845, the 1st of June, 21st of August, and 5th of October, 1846, and published them at once; but his greatest and most important work, which contained the solution of the whole problem, only appeared in the 'Connaissance des Temps for Jan. 1846.' On the 6th of August, 1846, he communicated to M. Cassini, of which he had obtained the perturbing planet, before Professor Challis, in September 1845, and the same, with some modifications, in the following month, October 1845, before the Academia, and Prof. Astronomer Roya—still without publishing anything. The results which Le Verrier derived from his observations with some fresh corrections relating to a diminution of the distance, in the beginning of September 1846. The young Cambridge geometer," continues Humboldt, "has expressed his surprise at the results we have obtained in a subject of this chronological succession 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 not an instance of intention of interfering 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; as well the facts must always determine 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 perhaps 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, and has been calculated with the highest degree of probability, making the total number of periodic comets 27." The mathematical results which are based upon the data of Galle and Le Verrier, and which have been calculated down to December 31, 1853, amounted to 4 periodic comets, and 107 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 1940. A very brilliant comet which appeared in 1566 is supposed by Mr. Hind to be identical with the former. This comet had been observed by Dr. Galle in 1846, and by Dr. Galle and Dr. Galle in 1853, and by Dr. Galle and Dr. Galle in 1856, and by Dr. Galle and Dr. Galle in 1860, there being an uncertainty of two years in the elements on which the return of the comet is calculated.

In the division of stellar astronomy, beyond the region of the solar system, great activity has been displayed by astronomers. Zones of stars, down to those of the ninth magnitude, double, and multiple, and variable stars, have been with unintermitting labour and perseverance observed and catalogued by Lalande and Lacaille (whose catalogue, and another of great value, have been published by the British Association), Bessel, Argelander, Airy, Lamont, F. G. W. Struve, Chasenac, Rümcker, Cooper, and many more men of profound attainments and indefatigable zeal. The value of star-catalogues has, indeed, hardly been estimated. Of the several star-catalogues which have been published the most important is that of Struve, and indeed the 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 philanthropic grant to the Irish Society, is one of the most extensive, and has been published in 1829, and the name of new and the disappearance of old stars, may be mentioned the hypothesis of F. G. W. Struve, that light in its passage through the boundless regions of space becomes invisible, and eventually extinguished—a theory which, if it could be established, would open a wide field for reflection and investigation.

One of the most important recent additions to stellar astronomy 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 continuation of his father's work, and the second part was the actual completion of the famous catalogue. Sir John Herschel's four years' residence at the Cape of Good Hope, in the words of Humboldt ('Cosmos,' ii, 303), "constitutes an epoch in respect to the more exact topographical knowledge of the southern heavens," and it is "one of the steps in the history of astronomy," and of the actual data on which the mass of observations made, 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 magnificently large 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 54 feet focal length, and is by far the largest telescope—have been formed in a telescope instrument constructed under his lordship's personal supervi- sion. 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 seeing many points which had previously eluded the attempt. Besides showing that these hitherto unresolved nebule were wholly composed of stars, Lord Rosse's telescope disclosed many unexpected peculiarities of structure—as, for example, a very remarkable and well defined spiral arrangement in several of the nebule which resisted all its powers of penetr- ation. Some of the so-called nebulous stars have also been shown by it to have a central star-like point placed in a nebulous nucleus, beyond which, but distinct from it, is a nebula extending for many light-years.

It will perhaps be expected that we should allude, but an allusion will be sufficient, to what "in some measure" (borrowing Mr. Airy's words) "belongs to astronomy"—M. Foucault's "experiment on the rotation of the plane of a simple pendulum, in vacuo," and an extension of the work which excited very great attention both in France and England, as visibly proving, if proof were necessary, the rotation of the earth.

We may perhaps not unaptly conclude this sketch by a brief reference to a few of the labours of Mr. Airy at the Royal Observatory, which may indeed almost be regarded as an epitome of recent astronomical progress. Under his ad- ministration the observatory at Greenwich has become second to none in the world. To render the observations made there useful, and to keep them in the very latest list of those that are needed, and 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 regularness not before attempted. He has also procured the reduction under his own superintendence of the Greenwich Lunar Ob- servations from 1750 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 thick quarto volume 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 means of the telegraph, and the electric telegraph. This by 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 mark by the fall of the pendulum with that of the observatory, the true Greenwich mean-time for maritime and other purposes.

We ought also perhaps to notice that, among other good works at the Royal Observatory, 390 M., of which 380 M. was laid before the Academy of Sciences, Paris, his great work entitled 'Reduction des Observations faites aux Instument Méridiens de l'Observatoire de Paris, depuis 1800 jusqu'à 1829,' a work which he had stated that he performed under the authority of any of the staff of officers employed at the observatory.

URANOTANTALITE. [Mineralogy, S. 1.]

URBAN, D. [NATAL, S. R.]
URCHIN. [HEDGEROW.]
URE, ANDREW, M.D., a distinguished chemist, was born at Glasgow in the year 1778. He was educated in the university of his native town, and afterwards studied medi- cine at Edinburgh, and took his degree of M.D. at Glasgow in 1801. In the following year he was appointed professor of chemistry and natural philosophy in the Andersonian Institution in Glasgow. He also gave the lectures on materia medica in connection with the medical courses of this institution, and took his degree of M.D. at Glasgow in 1816. For this purpose visited London, where he made the acquaint- ance of many of the distinguished astronomers and chemists who resided there. He was also appointed astronomer, and lived in the observatory, where he was visited by Sir William Herschel. In the year 1813 he published a 'Systematic Table of the Materia Medica,' with a dissertation on the action of medicines. In 1816 he succeeded the geological and meteorological observations, and has obtained for the author a lasting reputation as a natural philosophe. He subsequently wrote several papers on chemical subjects, all remarkable for the accuracy of the observations and the care with which these papers were prepared, the constitution of muriatic acid, and on the construction of a new eudiometer. In 1821 he published a 'Dictionary of Chemistry,' which was remarkable for the extent and accuracy of its information on all subjects of chemistry, and it was followed by a second edition the following year (1828) he published a paper. On the Ultimate Analysis of Animal and Vegetable Substances, in the 'Philosophical Transactions.' This paper was remarkable as being one of the first to initiate the brilliant period in the study of the composition of organic bodies. It was published in 1824, and was one of the last books on this subject that were published under the influence of the Noachian deluge on the surface of the earth. In 1828, Dr. Ure removed to London, and in 1834 was appointed analytical chemist to the Board of Customs. It was in connection with this important office that he obtained materials for many of his subsequent works. In 1836 he produced a work on the 'Philosophy of Manufactures,' and in 1836, 'The Cotton Manufacture of Great Britain compared with that of other countries.' In 1839 he published a great work, 'On the Arts and Manufactures.' A second edition of this work was published in 1851. His most important works are the composition of the most accurate kind and conveyed in a most lucid style. He was elected a Fellow of the Royal Society of London in 1822, and was one of the original Fellows of the Geological Society, and a Fellow of the Astronomical and other scientific societies both in this country and abroad. He died at his residence in Gower-street, London, on the 2nd of January 1857.

UREDINACRÉ, a family of Fungi, belonging to the sub-order Sordaria. It includes various forms of Fungi, which occur on diseased vegetable tissues, and which are hence called Blights. The spores are single, often partitioned on more or less distinct sporophores, fiosci of the fruit obsolete or mere peduncles. [Fungi.]
USES, CHARITABLE AND SUPERSTITIOUS.

USURY. Although the legitimacy of interest upon moderate and conscientious terms has long been recognised amongst us, has, until quite recently, been believed desirable to make the law the rate at which it should be taken, and interest beyond which no man has ever been stigmatised with the odious appellation of usury. [In-

interest, vol. xii, p. 506.] It has been reserved for our own
time to carry out a principle which political economists hitherto have preached, that no person taking more than the rate of
good 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 statute 6
& 7 Will. IV. c. 41, enacted that bills or other securities
should not be void because a higher rate of interest than was
allowed by the statute of 12 Anne had been received thereon.
The statute 1 Vict. c. 80, next enacted, that bills payable
within 12 months, should not for a limited time be liable
to the usury laws and that any person allowing limit had long
been 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
leading to be liable to the penalties of the usury laws; but it
only sanctioned the law which had long been nullified and
forborne any money on the security of land.
The public mind having thus slowly advanced in the direc-
tion of the policy advocated by Bacon above two centuries
ago, at length for the first time took still wider measure,
when in the statute 17 & 18 Vict. c. 90, after many years in
the preamble, that 'it is expedient to repeal the laws at
present in force relating to usury,' proceeds to repeal wholly,
or in part, eleven English, five Scotch, and four Irish Acts,
on which the whole penalties of usury previously rested; and
among these Acts are included those relating to annuity
transactions. [Annuitv.] 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
renderable to no other rules than those which govern contracts
in general.

(Blackstone's 'Commentaries,' Mr. Kerr's edition, vol. ii.
p. 475.)

UTAH, a Territory of the United States of North America,
lying between 37° and 42° N. lat. 106° and 109° W. long.
It is bounded S. and E. by the Territory of New Mexico;
E. 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 at 369,170 square miles. The
population in 1850 was 11,380 (of whom 25 were free colour-
ous persons, and 26 slaves enroute to California), or 04 to the
square mile: but this does not include the native Indian popula-
tion, who were estimated by the Commissioner of Indian
Affairs in 1853 at 11,600.

Surface, Hydrography, &c.—The Territory of Utah occu-
pies for the most part a vast broken depression, known as
the Great Basin, which lies between the Rocky Mountains
to the east and the Sierra Nevada to 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 con-
nuous mountain chain, the whole being broken by an
elevated tract, which is sometimes a swamp. On the
east the rocky barrier is broken through by the head streams
doing their beds to the Colorado, the only river which finds its way out of the
Great Basin; all the others which flow into the basin from the
east in being joined in their courses by the large
lakes which occupy the bottoms of the larger valleys. The
Great Basin is about 500 miles long, from east to west, and
little less, and some 4000 feet above the level of the
sea. Parallel to the main ranges of the Sierra Nevada and
the Rocky Mountains, there are the Topor ranges, of which
the Wasatch Mountains on the east are the most important.

URLE. [Chemistry, S. 2.]
Some of these secondary chains attain an elevation of from 2000 to 3000 feet; and from these diverge cross ridges, which are separated by wide valleys. A portion of the Great Salt Basin consists of arid plains, on which artemesias and saltcarnions are almost the only plants, but in many parts these plains are so impregnated with salt as to be unfit to support all but the most hardy or salt-tolerant vegetation. This is a singular country for the great valleys. Of these by far the largest is the Great Salt Lake Valley, which is about 120 miles long and from 20 to 40 miles wide, the Great Salt Lake occupying the greater part of the northern portion of it. In so far as the valley is not indented by several small mountains to the shore, it is a small, sandy, irremediable barren, on the north it is a swamp, on the east and south-east, where the Great Mountain range is fertile, the mountains to the shore. The climate of the valley is very dry and mild; but rain seldom falls during the summer months, so that the agriculturalist is to a great extent dependent on irrigation. The other valleys bear a general resemblance to the Salt Lake Valley, but they are much smaller. The chief are—Utah Valley, about 60 miles long by 20 miles wide; Sand Pitch Valley, 45 miles long by 30 miles broad; Bear River Valley, South Valley, Yuba Valley, Cache Valley, and several others. The latter portion of the Great Basin is not distinctly separate from the Great Basin, the Valley of Green River with its tributaries, which occupies the eastern portion of the territory from the Sierra Madre to the Bear River Mountains, is in the latter class, being more than 150 miles long; but it is so elevated and waterless as to have been thought not to contain a single spot available for agricultural purposes. The little valley of the Uintah River, a more southern tributary of the Colorado, is much warmer and more promising, but all this eastern portion of the country is, with this exception, barren.

Utah possesses no great navigable rivers. The Colorado, as already mentioned, is the only river which flows out of the Great Basin, and it is a stream of little consequence till it has flowed some distance along the southern boundary of New Mexico. There are indeed accumulated in the gorges of the mountains unfailing stores of snow, which furnish during the whole of the summer abundant and perennial streams, which in some instances possess a considerable volume of water; but many of these never reach the bases of the mountains, and the great majority are lost in the arid plains. A few find their way to the lakes, but from the lakes, except from one to another, there is no outlet. Some of the streams which connect the lakes are however used for irrigation, and may become of essential importance for manufacturing purposes. The most valuable of these rivers is the Jordan, a rapid stream which unites the Great Salt Lake with the Great Salt Lake City; it is on this river that Salt Lake City is built, and already several manufactories are established along its banks.

Of the numerous lakes which are in the territory the largest and most remarkable is the Great Salt Lake, which lies at the northern end of Great Salt Lake Valley. The lake is about 70 miles long, from 30 to 30 miles wide, and has a shore-line of of 291 miles. Its water is saturated with chloride of sodium (salt). Dr. Gale, who made an analysis of its water for the United States government, says that it contains full 20 per cent. of pure chloride of sodium, and not more than 2 per cent. of other salts, and is one of the purest and most concentrated brines in the world. The specific gravity of the water is 1.70. Several picturesque islands rise from the briny waters. Of these the Great Salt Island is the most remarkable feature of the lake. On the mountains on each side of the lake are several distinct terraces, exhibiting unmistakable evidences of this valley having been at some time the bed of a great inland sea. The other lakes are much smaller than the Great Salt Lake; the water of Lake Utah, which is connected with the Great Salt Lake by the river Jordan, is said to be quite fresh. It receives several streams from the mountains. In the neighborhood of the Great Salt Lake, and in other parts of the territory, there are numerous carbonaceous rocks prevalent. In the neighborhood of the Great Salt Lake rocks of granitic and siliceous character occur, with hornblende rocks, and talcose and mica-schists. The more elevated portions of the mountains appear to consist of carboniferous limestone, which, in some places, lose their granular character, and become sub-crystalline, or threaded with veins of calcareous spar. All the elevated ranges on the north, south, and west of the Great Salt Lake, are composed of the Carboniferous limestone, which generally rests on 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 structure of a granular sandstone. This conglomerate extends in several places; and along the valleys are tertiary clays, &c. Good building-stone is quarried in the vicinity of Salt Lake City. Of the mineral wealth of Utah little is really known.

Soil, Climate, Productions, &c.—A large proportion of the territory is characterized by a soil which is very rich for horticultural purposes, and which is available for agricultural purposes, though limited in extent as compared with the intervening desert tracts, a much of it of extreme fertility; and according to Captain Sianbury, who made a careful survey of the territory for the government, the best part is watered, and would afford support of a large Though not dense population. These fertile and habitable tracts are for the most part confined to the narrow strips of alluvial land along the bases of the mountains and the bottoms of the warmer and more sheltered valleys. Along the western foot of the Wasatch range occurs one of the richest of these tracts, a narrow slip only a mile or two wide, but stretching for more than 300 miles in length. In the valley of the Jordan it is much wider. The soil on the top of the mountains is rocky and barren, as those of the Tuilis, of the Timpanogos and others of the Traverse Range. In fact the most available part of the Great Basin appears to consist of the valleys along its eastern border, sheltered by the Wahsatch range. The most productive tracts are those of the Jordan, generally covering the more argillaceous rocks, mixed with the debris of the limestones. There also occur in the valley bottoms very rich vegetable and marly loams. So productive are some of the soils that Captain Sianbury says the crops could be produced in three acres and a half of land a yield of 15 bushels; and other authorities speak of 50 or 60 bushels of wheat to the acre as being by no means unusual, but that we can, we think, be no doubt that such must be exceptional cases. The climate of Utah is that of the same parallel of latitude on the Atlantic, and the winters are much more temperate; in the Salt Lake Valley the thermometer seldom descends to zero. But on the higher plains the heat is often oppressive. Over these plains the mirages are frequently observed in the morning light. The eastern section of the country is cold. Throughout its habitable portions the territory rain seldom falls between May and October, and can never be relied on for agricultural purposes. The July thermometer would be irremediable for irrigation, and may become of essential importance for manufacturing purposes. The most valuable of these rivers is the Jordan, a rapid stream which unites the Great Salt Lake with the Great Salt Lake City; it is on this river that Salt Lake City is built, and already several manufactories are established along its banks.

The principal cereals grown are wheat, oats, maize, barley, and rye. Very little buckwheat is raised. The common potatoes grow luxuriantly; of sweet potatoes the crops are limited. All the vegetables peculiar to the middle and western states succeed here. The sugar-beet grows to a large size, and is being raised, though not largely, for making sugar. Cotton, the sugar-cane, and rice will, it is said, grow in some districts, but they are evidently not suited to the climate. Tobacco and flax are raised in small quantities.

A portion of the territory is well adapted for grazing, though the bunch grass on the lower slopes of the mountains, which at present feeds vast herds of antelopes and deer, is burnt during the summer months. Horses are the animals with which the inhabitants perhaps possess the largest proportionate number; but they have a considerable number of cattle, and there is a growing attention being paid to sheep, which are in great request for their wool.

The climate of its natural state is almost destitute of rain. The only time it is not is in the rainy seasons or occasional showers, on the banks of a few of the streams and occasionally on the bases of some of the mountains. Wild game abounds. The antelope, deer, bear, and panther are very numerous. The climate of the state is therefore remarkably favorable to keeping good hunting stock.

The most common kinds are geese, geese, ducks, curlews, plovers, gulls, blue herons, cranes, pelicans. &c. Moquitoses and sand-flies are very numerous and troublesome. But the greatest insect pest is a large kind of cricket, which at irregular periods appears in enormous numbers, and commits terrible ravages.
Utah from its insalutaged situation must be to a great extent known upon its own resources, if the peculiarity of its population did not cherish by every means their separate and independent spirit. The mountains, the deserts and the great and difficult difficulties of all other settled states, with agricultural resources little more than sufficient for the support of its own increasing demands, and without any ample product or material required by the arts or luxuries of life, the latter to the女主都 authorities and the trade and commerce and the amount of external trade and commerce; while there will probably be a sufficient stimulus to the growth of such manufactories as are required for ordinary domestic purposes. With California the regular communication is maintained, and such organized states as have the power of the璇 for 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 necessary in order to the lead their followers and the consequent and the consequent consequences 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; and they struggled on resolutely, planting crops, and otherwise preparing the way for their successors. It is hardly possible to describe any one of the consequences. 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 the difficulty of the country for the acquisition of land, and, as is well known, they entered into a treaty with the United States, they elected the usal state-officers, and applied 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 remitted 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 United States, remained virtually independent, and governed by the Mormon legislature. Young was however superseded by the President, who appointed a 'Gentile' governor, and the federal government assumed a more direct control. This led to disputes, and at last the federal judges were expelled, and the government was formed. This led to a war between the federal and Utah. Forces have been sent against it to subdue it. Little impression has been made as yet; there has been no serious fighting; but supplies have been intercepted, and detachments cut off by the Mormons; but the state forces are gradually being strengthened and are approaching their city.

The religious opinions of the Mormons are stated under Sarras, Joseph, S. 2. Here however as Utah is their appointed Zion, it is only a small step to their inalienable authority to an extent in 1848. But the whole of the province had really passed out of the hands of Mexico for some years before the year 1848; sold while the true West of Mexico, or what now forms the state of California, was held in the possession of the citizens of the United States, he Great Basin, hitherto abandoned to the native Indians, is open to any body of settlers strong enough to maintain themselves within it. By such a body it was occupied in 1847. We shall not relate here the early history of that remarkable sect the Mormons, whose occupation of the territory has invested Utah with so singular an interest. [Sarras, S. 171]...
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 the death of the old Prophet the Lord Barbee says: '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 Stanbury, Topographical Engineer, U.S. Exploring Expedition, in the 'Voyage of the Great Salt Lake 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; Gazetteers of the United States, &c.)

UVAROV, SERGY SEMENOVICH, or OUVAROFF, as the name is written in French, an eminent Russian statesman and author, was born about 1789 of a noble family, and received his Christian name from the Empress Catherine, to whom his father was side-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 establishment of a great institution for the study of the languages and literatures of Asia. As a young man 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 success. (The Emperor of the Russian Empire," 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 a more retrograde character than they had been, Uvarov, after in 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 1818. In the following year he became director of the department of manufactures and internal commerce, and he was subsequently for some years minister of finance. That his influence was not extinct was proved by his being able to establish in 1823 an institution for the instruction of young diplomatists in the Oriental languages, carrying out in some degree his early project. After the accession of the Emperor Nicholas he was sent in 1848 Minister 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 was acting minister of education, introducing 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 1848 he again retired from office on occasion of some restrains 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 Philology and Criticism,' and the other 'Political and Literary Sketches' ('Études de Philologie et de Critique,' St. Petersburg, 1843, 2nd edition, Paris, 1845; 'Esquisses politiques et littéraires,' Paris, 1848). All of these essays are in French, except two on philosophical subjects, one 'On the poet Nonnos of Panopolis,' and the other 'On the Anti-Homeric Age,' which are in German. In the preface to the essay on Nonnos, addressed to Goethe, the author expresses an opinion that "is now for ever for every poet 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 desirous of devoting himself to venturing to print in German, and before publication addresses the public in a half, because his 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, there are 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 fatigue the reader. Uvarov is reported to have written memoirs of his own time, which may probably form the best portion of his writings in the eyes of posterity.

UWIN, THOMAS, R.A., was born in Pentonville, London, in 1758. Apprenticed to Smith, an engraver of some reputation 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. Three times awarding himself the medal which Sir C. Bell was then delivering to students in art. 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; but his chief aim was to distinguish himself in painting, which he did, to the general satisfaction of Sir C. Bell, and for many years was elected by him, and the opinions of the judges, as grace. He also made 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 1836 he visited Italy and the studies which 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 peasant. These works painted with a light bright pencil, picturesque in costume, gay in colour, and cheerful in spirit, became at once very popular, and their popularity remained undiminished as long as he continued to produce them. As samples of these many Italian pictures may be mentioned, 'The Mandolin,' 'Drawing for the Festa,' 'Neapolitan Peasantry returning from a Festa,' 'The Fishermen returning from Naples,' 'Interior of a Saint Factory at Naples,' 'Festa della Donna del Arco,' 'Loggia of a Vine-dresser's cottage in the afternoon of a Saint-day,' 'Mountaineers coming down from an alp at Bourbon,' 'A country scene on the 4th of June,' 'Teaching a Child the Tarantella,' 'Children asleep in a Vineyard,' 'Making a Nun.' He also painted some English peasant pieces, as 'The Top of the Stile,' 'The Pet of the Village,' &c., but with less success. Later he painted illustrations from popular authors, Stendhal, Mme. Dorothee, &c.; and still later he essayed a loftier class of subjects, as 'Fear and Cordelia in Prison'; 'Cupid and Psyche' (painted for Prince Albert); 'Psyche returning from the Infernal Regions with the Casket of Beauty'; 'The Reproof'; 'John the Baptist proclaiming the Messiah on the Morning after the Baptism'; 'Judah,' &c.; but these were severely adapted to his pencil. Mr. Uwins was elected a Royal Academician in 1836; and from 1844 to 1865 he held the office of librarian to the Royal Academy. He was also appointed keeper of her Majesty's pictures in 1843, 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. Uwins is represented in the pictures by Mr. Uwins, 'The Vintage in the Clare Vineyards, South of France,' and 'Le Chapeau de Brigard'; in the Sheepsheiks' collection are four more characteristic examples of his pencil—the Mother teaching her Child the Tarantella, another showing a Child in its ammora, 'The favours of the Shepherd,' and 'Suspicion.'

UWAROWITE. [MINERALOGY, &c.]
VALENTIA, HARBOUR OF. [Kerry.]

VALERYLE. [Chemistry, S. X.]

VALLEJO. [California, S. X.]

TOP THAT! A common name for the
Convolvulus majalis. This plant is too well known to need
description. The genus Convolvulus has a bell-shaped
6-parted deciduous perianth; a 3-called 2-ovalled ovary; a
blunt triligious stigma; berry with 1-seeded cells; flowers
yellow. C. majalis, the Lily of the Valley, is about a foot high,
with two ovate-lanceolate radical leaves. The flowers are race-
mose, nodding, pure white, globose, bell-shaped, and fragrant.

VAN DIEMEN'S LAND. [Tasmania, S. X.]

VANCOUVER ISLAND (or Quadra and Vancouver
Islands) lies off the western coast of North America in the
North Pacific. It is long and narrow, extending in a direc-
tion from south-east 42° 24' to north-west 50° 3' N. lat., and
between 122° and 128° W. long., the length being about
60 miles, the average width 50 miles. It is overtopped at
its southern end by the continental headland of Cape Flattery,
and between is the Strait of Juan de Fuca, five leagues wide
near its entrance, and running in an east-south-east direction for
about 100 miles, widening in several parts, extending south-
ward into Puget's Sound, and forming several bays on the
continental shore, then, suddenly narrowing, turning northward through an archipelago of small islands, called the
Arro Archipelago, thence widening into the Gulf of Georgia, and
leading to the Sound of Juan de Fuca, the entrance architected by America. 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 the Arro Channel, which is narrow in its extremities, but
expands to a considerable width in the middle. At Weathuynsen Inlet, which is at the north end
of the Arro Canal, several extensive beds of coal have been
found, the site of which has been named Newcastle. Coal
exists also in the northern part of Vancouver Island. At
the southern end the settlement of Victoria has been formed,
on a harbour named Camaosack, safe and easily accessible
for vessels, but having the drawback of being
exceedingly supplied with water. The other principal harbours
are, Nootka Sound, Clayquot, Nitnnat, 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
covered with pines, and whose sides are intersected by 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 climate is mild. Vancouver Island is 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. Van-
couver Island was made over in 1846 to the Hudson's
Bay Company by a charter, on condition that they should
colonise it; the government reserving the right to reclaim
occupation of the island for Great Britain within a specified
time.

North of Queen Charlotte's Sound lies Queen Charlotte's
Islands, between 52° and 54° N. lat. The group consists of
three islands extending about 150 miles in length, by about
60 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.
Traces of silver have been found in the rocks. The
interior of the islands is hilly and well wooded, the climate is
healthy, and the soil remarkably fertile. The islands contain
some beds of coal, and several fine specimens of lead and
copper have been found. The coast is washed by waters
from the north and north-east winds, and has a good bottom,
with a depth of 8 to 15 fathoms. The entrance of the bay
is formed by two steep rocky capes (Galata and Hodrova, or
Sughanilik), 44 miles asunder. The shores sink gradually
to the head of the bay, where in the neighbourhood of the
mouth of the river, they are level. The Faravah River (the ancient Lyr-
gines), which empties itself in the Bala or near Shima, after
turning the two lakes of Devne, discharges itself by a broad
stream into the Black Sea, along the foot of the southern
walls of Varra. The distance between the eastern shore of the
eastern Lake of Devne, and the western shore of the western
lake, is less than half a mile. It has been in contemplation to deepen
the channel of this river so as to admit ships to the lake, which
would thus be converted into a harbour capable of affording
shelter and accommodation to the largest fleets in all weather.
In the isthmus between the two lakes Alexander the Great
defeated the Triballi. The isthmus is from a mile to a mile
and a half broad.

Varma 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 600,000l. Austrian
steamers between Constantinople and Galata put in at Varma.
Under the walls of Varma the Sultan Murad II. in 1444
defeated the Hungarians under King Ladislaus (who was
killed) and John Hunisades. The Russians took Varma in
1828. The Anglo-French army encamped in Varma and its
environ in the summer of 1854, previous to its embarkation
for the Crimea.

VAUQUIEUX UTITE. [Cézambeau.]

VENIRE FACIAS. This writ, and also the other
writs referred to under this head (vol. xxxvi., p. 245), the
disrings and habeas corpus juratorum, have been in effect
abolished by the Common Law Procedure Act, 1852, which
abolishes the law of nisi prius. The only sufficient reason supplied
by the report of the Judges' Committee, which has been
accepted by the Blackstone's
' Commentaries,' Mr. Kerr's ed., vol. iii. (p. 380).

VENUS'S FLY-TRAP. [Dloma.]

VERNAL GRASS, SWEET. 'Anthosanthum.'

VERNON, ROBERT. Though possessing personally no
title to an enduring name, yet as the founder 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 1854 by the purchase by Lord
Liverpool's government of the collection formed by Mr.
Angenstein. 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 the gallery was considerably
enlarged, by occasional grants 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 inter-
est. In every other country the possession of worthy speci-
mens of the pencils 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 di-

gence, perseverance, and skill, during a long commercial
career, raised himself from very humble into very affluent cir-
cumstances; earning at the same time a high character for
liberality, and enlarged though unostentatious benevolence.
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 ten years he had thus
ten ever 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 the national art. 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
admired. 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 22d, 1547, to the Trustees of the National Gallery. The collection so transferred comprised 157 pictures, all but two by British artists, and a large 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 favourable specimens of a large proportion of the chief deceased and living English painters. 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 22d, 1549. Since his decease the Vernon collection has found a temporary resting place in Marlborough House. To it has been added the splendid bequest of Mr. Turner (Travers, J.M.W., & S.); and Mr. Sheepshanks has also presented to the nation his noble collection of 253 paintings in oil by English artists; but his gift is transferred 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 Gallery 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 are a marble group by Gibson of Hydas 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. [Skelet. 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, 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 errors has been experience, as to what may be regarded as the true 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.

![Diagram of a typical vertebra](image)

This plan does not include the parts which constitute the diverging appendages. Of this plan Professor Owen says, "The terms in Roman type signify those parts which, being usually developed from an independent centre, I have termed 'autogenous' elements. The italics denote the parts more properly called processes, which shoot out as continuations from some of the preceding elements, and are termed 'exogenous': e.g., the diapophysia, the parapophysia, the hypapophysia, and the zygapophysia of the oblique or articular processes of human anatomy."

The autogenous processes generally circumscribe holes about the centrum, which is in the chain of vertebrae form canals. The most constant and extensive canal is that formed to the centrum, and embraces the central circulating organ (A), the heart, and the large trunks of the vascular system. On the sides of the atlas vertebrae, in the cervical 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 elements, presents the centrum with a central canal, from which the various appendages are developed. A common centre; such a vertebra 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 mammals the hemapophyses are articulated or ankylosed to the under part of the centrum and the space is filled with fat 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 branchial arches in man are completed. In the same manner that the parts 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 with which all vertebrate animals are endowed may be traced to a common stem, and the diverging appendages of which all are 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 of the four appendages of man, all the parts are of 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 and of the limbs in the mammals, the flippers of the seals and whales, and of the arms 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 Mammals, and the legs in Man. These homologues include not only the totality of these organs, but the individual parts, and the scapula, clavicile, coracoid process, humerus, radius, ulna, carpal and metacarpal bones, and phalanges, in the higher mammals and Man have their homologues, and the branches of the thoracic vertebra. So with the pelvic arch, with its ilium, ischium, pubis, femur, fibula, tibia, taral and metatarsal bones, and phalanges.

We have not space here to enter into the details of the application of this general plan to the structure of the skeletal system of mammals. This has been done in a masterly manner by Professor Owen, in his 'Report on the Homologies of the Vertebrate Skeleton,' published in the 'Transactions of the British Association' for 1849, and also subsequently in an independent volume devoted to the same subject. This department of anatomical 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.

**VICO, FRANCESCO DE,** one of the most distinguished astronomers of modern Italy, the son of Count Ascanio de Vico-Ubaldini and the Countess Analia Archinto, was born at Macerata on the 16th of May 1699. He was educated partly at the Collegio dei Nobili in Urbino, partly in the school of the well-known congregation of the Scuolat at Siena, and entered the Jesuit Society as a novice in 1823. After spending with much distinction throughout the usual stages, both as a scholar and as a master, in the Roman College of that Society, he was appointed (in 1833) assistant of Father Stephen Dumouchel, who was at that time in charge of the observatory; and it was a sort of preface of the history of his all future work. In the fall of the following year he 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 was in the midst of a general satisfaction of being the first to observe this comet, on the 5th of August 1835. Soon afterwards, Vico, in consequence of the great age of F. Dumouchel, becoming
the principal astronomer of the Roman observatory, undertook a long series of observations for the purpose of ascertaining the suspected error in the latitude of Rome, as determined by his illustrious predecessors, Boscovich, Calandrelli, Conti, and Reichenbach. These observations, which amounted to nearly 8000 in number, were eminently successful, 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 Airy, which was completed in 1850. Subsequently, 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 parallax of the planet. This work, which the author has so fully described, contributed more than all his previous labours 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 all his detailed reports on the nebulae, which about that time became a prominent subject of interest, fully sustained that reputation.

Father De Vico however is most popularly known as an observer of his numerous and successful discoveries in the cometary system, which he was one of the earliest in 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 comets, in which his claim to priority of discovery is undisputed. The eighth had been observed by another astronomer two days before it was discovered (independently however) by Father De Vico. Another more humble but hardly less useful work undertaken by Father De Vico is the improvement of the 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 Revolutions of 1848, by which, in common with the other members of his order, he was driven from Rome. He was 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 these countries; but the circumstances of his order at that time deterred him upon establishing himself in the United States of America, and he had almost completed his arrangements for the purpose, when he was seized with acute inflammation of the chest, and was carried off after a short illness. He died in London on the 15th of November 1848, at the early age of forty-three. Father De Vico is chiefly known in literature by his contributions to the 'Raccolta Scientificia,' a scientific journal which owed its origin principally to himself, and which still continues to appear in a new form.

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**VIC**

*Augusta Victoria; on March 18, 1848, Louisa Caroline Albertia; on May 1, 1820, Arthur William Patrick Albert; on April 7, 1853, Leopold George Duncan Albert; and on April 14, 1857, Beatrice Mary Victoria Feodore.*

*We consider it desirable, in the instance of our present Queen Victoria, to take a public notice of certain events 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 sketch would be without any real value; but, as it is a subject of considerable interest, and we therefore prefer to notice, in the dry form of a chronological 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 arts and sciences. The industrial world is rapidly advancing in 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 accession of freedom can 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 education, and to be effected by the influence of law, 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 that the spirit of concord and community more widely spread by common interests than any other in the world. He will dwell upon the progress of the civilizing Arts—how Music has again become an enjoyment for all; how Painting has received a more important impulse in the extension of taste, and how it has become more than an amusement; how the branches of Art have come to the aid of manufactures; how, if Literature has become less bold and original, it has applied itself to the advance of the knowledge and amusement of a body of readers, who have increased tenfold since the queen Victoria came to the throne. He will 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, he will see the religious principle which has ever distinguished 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 regarded the history of the last quarter of a century, not to feel how essentially that rule has contributed 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 got into difficulties, but a prince with the character of a true statesman, with the record of some events which have a natural bearing 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 only attempt to offer an aid to the history of the time, 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 Empress of India. October 10, William IV. succeeded his brother as King of Hanover, as the succession is restricted to males, and thus the connection of the royal family with the Continent was warded off for at least 153 years. July 6, William IV. was buried at Windsor. December 29, the American United
States steamboat Caroline, which had brought assistance to the rebels, was attacked and burnt, 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 Bond, and a proclamation of the President of the United States forbids the attacks of its citizens on the possessions of another nation. Royal Tariff change was 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 the adjustment of the disputes there. April 23, the Sirius (which left April 4) and Great Western (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 lunatic named Thon, who assumed the name of Sir John, took possession of half kind of Jerusalem, having excited a number of deluded followers against the Poor-law Act, a contest ensued with the military near Canterbury, and Thon having shot two men was himself shot by one of the soldiers. June 28, 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, Lord Stanley, master of the rolls and chancellor of the Irish Tithe Commissions Acts were passed. August 16, the Queen prorogued parliament. On September 17, the London and Birmingham Railway was opened throughout its entire length. October 9, the Earl of Durham declared his resolution to use the force of the state, if necessary, in sequence 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 Sit Mohammed Khan, the chief of Cabul, had joined Persia with an intention of attacking the British possessions in India, whereupon the governor-general had adopted the course of Shah Soojah in his claims on the throne of Afghanistan. [AFGHANISTAN, S. 11] November 12, the first men in Union were in the Cape, in Upper Canada, 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 Academie des Sciences at Paris made a report on the invention of M. Daguerre, the originator of the daguerreotype process, which has been followed by telegraphic processes. Troops of the East India Company occupy Aden. May 6, the government having been defeated in the House of Commons on a bill for suspending the constitution of Jersey and the Channel Islands, the Assembly had refused to pass the prisons' bill, Lord Melbourne announced the death of Lord Melbourne, and the Lord, that the ministry had resigned. On the 8th, Sir Robert Peel received her Majesty's commission to form an administration; but owing to the refusal of the Queen to dismiss the ladies of her household, he declined the commission, and on the 10th Lord Melbourne was reinstated.

June 6, 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 entrepot duties, though it was ultimately only a farthing per 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 continued in 1841. 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-baptist. They were led by Mr. John Frost, a part of special constables, assisted by about thirty volunteers. 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 killed and wounded. The number of the leaders was 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 1850 a free pardon was granted to them. Government announced her intended 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 Charter was contemplated at Sheffield, but was called off, and 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 brought before the House a bill, which was introduced by Mr. Parnell, who had brought an action against Harsand, 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 author of the libel fled to America. January 30, a note, complaining of the establishment of a monopoly of the trade in sulphur guaranteed to a French company, in contravention of the treaties with England. As the Neapolitan government refused satisfaction, an English fleet was ordered to Naples to protect the shipping of the English, and the mediation of France hostilities were prevented, 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 the better effecting Tithe Composition 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. Near Paris, on August 9, the sale of 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 English auxiliaries evacuate San Sebastian and Passages. December 8, Mehomet Ali, of Egypt, who had been for some time resisting the claims of Lord Turkish to the sovereignty over Egypt, who had invaded and taken possession of the country, having surrendered Ireland and France, accepted on this day the terms the proposers of. Commodore Napier with an English fleet had greatly distinguished himself by his successful attacks on Beyrout and Acre. December 16, the remains of Napoleon, who had been interred at St. Helena, were that day deposited with great ceremony in the Hotel 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 spring several monster Repeal meetings were held to bear 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 20, after some further hostilities, the Chinese government proposed terms, by which Hong Kong was ceded to Great Britain, direct official communica- tion between the two countries was admitted, the British were 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 oaths of office. February 18, a dinner given to Lord John Russell in London, to celebrate the foundation of the most recent colony of Great Britain—New Zealand. 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 Tractarians, and a separate meeting called. Father Mathew continues his efforts in Ireland in favour of temperance. On this and two succeeding days, he was said to have administered the pledge to 120,000 persons.
country. April 25, a meeting called by the Archbishop of Canterbury, in London, to raise funds for sending out bishops to the new colonies in New Zealand, 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, limited the area, and applying the land produce fund to the expenses, was at the last minute altered. Sir Robert Peel, in a letter to the Times, 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 disturbed or interrupted. May 30, the case of the seven ministers of the presbytery of Strathbogie was brought before the Assembly of the Scottish Church; when they were suspended for having obeyed the order of the civil courts in the trial. 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 to appoint a Select Committee to possess the confidence of the country. June 4, the debate terminated, and the resolution was carried by 313 against 311. On the 7th, Lord John Russell informed the House, that in consequence they should appeal to the country. On the 21st, the Select Committee reported favorably on this amendment to the address was moved by Sir R. Peel; and 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, according to official returns, the_populace sent 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-arms armoury. December 31, Lord Ashburton 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 January 1842.

1844. January 17, the first stone of the new Royal Exchange was laid at Ho' of London. June 6, the deputys of the Anti-Corn-Law Association assembled 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 Cape Town on the Cape of Good Hope, were defeated by Captain Smith with a small force, whom they were beaten in a second action on June 26, and forced to submit. May 20, John Francis fires a pistol at the Queen, who escaped unjured; Francis was tried for the attempt at the Old Bailey, found guilty, and sentenced to be hung, 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 18, the treaty with the Chinese not having been ratified, the British forces entered the river Yang-tze-Kiang, and seized several forts with numerous cannon; and on the 8th they took possession of Shanghai. June 32, 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 protest the extreme distress. July 20, a law received the royal assent, bestowing 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 of England. August 26, the Queen and 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 imprison.

1845. January 9, O'Connell announced at a weekly meet-

Ding of the Repeal Association that "1845 is and shall be the great Repeal Year." January 20, Mr. Edward Drummond, the private secretary of Sir Robert Peel, was murdered at Cross by a man named M'Naghten, who was acquitted on March 4, on the ground of insanity, and removed to Beth lehem Hospital. On February 2, parliament assembled. February 17, the forces of the Army of the Nile defeated Sir Q. Napiers, at Tel-el-Ksela, and took the town, the Hydraulic Dale, and subsequently annexed Sine to the British empire. [Sino, S. 1; Indian Empire, S. 2.] About the end of this month, the Rebecca Riots took place in Wales, the object of which was the remission of the land taxes. The disturbances continued through several months. March 25, the Thames Tunnel was opened. May 18, the succession of the supporters of the non-intrusion principle took place from the General Assembly of Scotland, when above four hundred ministers resigned their seats. May 30, the Queen and Prince Albert visited the colony of the Cape of Good Hope. July 3, the Cartoons for the embellishment of the new Palace at Westminster were exhibited to the public. August 17, an Act for the pacification of the Scottish Church and of the royal assent, had had effect in staying the disruption. August 22, a great Repeal Meeting held on the hill of Tara. August 24, parliament was prorogued. August 26, the Queen and Prince Albert embarked at Southampton, on a visit to Louis Philippe at the Chateau d'Eu. September 10, the Queen arrived at Ostend. September 25, the Queen and Prince Albert visited Brussels and other towns of Belgium. October 7, the Irish government issued a proclamation forbidding the Repeal meetings, and O'Connell recommends submission. On the 14th, Mr. O'Connell, his family, and several other leaders were arrested, and committed to bail on a charge of conspiracy and sedition. October 27, the Welsh special commission opened at Cardiff for the trial of the Rebecca rioters, the principal culprit being a young farmer, who was sentenced to imprisonment for twenty years, with hard labor. November, the bills were passed, and the real wealth of Ireland was restored to liberty. March 5, Mr. Pritchard, the British ex-consul at Otaheite, was seized and placed in confinement, by M. Breut, the French governor, whose conduct, after much contention, was subsequently disavowed by his government. April 19, President Campe at Mexico and the United States was rejected by the Senate. On May 11, a meeting was held under the presidency of Lord Ashley, for improving the habits of the poor. June 1, the Emperor Nicholas of Russia visited England. June 6, the Faculties Act, regulating the employment of children and young persons, received the royal assent. June 14, a discussion was raised in the House of Commons on the subject of Sir James Graham opening letters at the Post-office. He contended that he had the right, but would give no further explanation. The letters said to be opened were addressed to Mazargn, and the information thus obtained had enabled the Austrian government to seize the brothers Bandiera, who had landed in Italy for the purpose of creating an insurrection. A Committee of Examination was appointed by Lords and Commons, but they only reported that the power had been occasionally exercised. July 29, a treaty was signed between England and Hanover for the settlement of the Stade duties. August 19, the new baths were held in Man-

chester for the formation of public parks, and 25,000l. were subscribed by November 1. September 6, parliament was prorogued. November 19, a meeting was held at Birmingham, for the establishment of public parks and baths. 1846. January 11, the Act for the establishment of certain charitable endowments was introduced in the House of Commons. February 4, parliament was opened by the Queen in person. On the 14th, Sir Robert Peel made his financial statement:
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's bill to enable the new ministry to establish a number
of postal offices, which was passed on March 14. May 5, a haizar in
aid of the Anti-Corn-Law Association was held in Covent
Garden Theatre, by which 25,000, of its membership, were
realised. On the 22d a meeting was held in London for the establishment of
banks, under the protection of the British-guarantees, in
the United States. May 23, the arctic expedition of discovery,
scribed by Sir John Franklin, sailed from Greenhith, and,
unfortunately, never returned. May 25, a terrible fire took place
at a village near Londonderry, by which 2,947 houses were destroyed,
and 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 part of a town, but nothing satisfactory was accom-
plished. June 30, Sir R. Peel's Act for the endowment of
Maynooth College received the royal assent; and on July 1, the Acts for the establishment of museums in large towns,
for the promotion of the study of the fine arts, and for
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
panic ensued; Sir Robert Peel was again called upon for
re-election. October 19, the Irish Roman Catholic bishops condemn 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 7, it being having been previously under-
stood 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,
colin Peel was again summoned for re-election. 1846. January 3,
the corporations of London and Dublin
presented addresses to the Queen representing the sufferings
carried in Ireland by the potato-rot of the previous year.
January 5, a meeting of agricultural labourers was held at
Wootton-Basset 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 16th, the surrender of the settlement and disband-
ment was opened by the Queen, who referred to the failure
of the potato crop, and recommended the consideration of
the propriety of relieving protective duties. On the 27th Sir R.
Pee!, in a speech tendered on March 13, potatoes having risen to a famine price in Ireland,
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 Choctaw nation for the cession boundary was agreed upon by the senate at Washington.
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 Protection of Life Bill (a coercive
measure for Ireland), the ministers were defeated, and imme-
diately resigned. On July 6, 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, because it was not to be permitted 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
Courts in Ireland. August 27, the Star Chamber in
Ireland declared by proclamation to be in a state of distress, 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 in the parishes; the minute was signed by all the
parishioners. December 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 300,000 persons were without
the means of sustenance. To be reprinted. 1847. January 2, the British Association established, by
which large sums were raised by subscription for the relief
of the distress in Ireland and Scotland, in both of which
parishes the provision of a labour rate had failed. In the
same month the new 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 6, the new Irish Poor Law Bill received the royal assent;
and on the 21st, that for the improvement of towns; and
on the 23d parliament was prorogued. October 17, thank-
givings were offered up in all the churches for an abundant
harvest. October 29, in consequence of a great monetary
pressure, 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 having
survived in England. At the beginning of March, April 10, a
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 without a struggle. In the Blackwater 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 22 for seditious writing in the 'United Irishman,' found
guilty, and sentenced to fourteen years' transportation.
July 20, an engagement took place between the Irish rebels
and the government forces at Ballingarry; the rebels
were easily defeated. On August 5, W. S. O'Brien was captured,
and on the 12th Meagher, O'Donohue, and Lyne. August 20,
twenty Chartist leaders were arraigned at the Quebec state
trials. August 29, Sir H. Smith defeated the rebels under Pretorius at
Bloem Platta, 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
Londonderry. September 28, twenty-five leaders were arraigned at the Blackwater trials. October 9, the trial of the Irish
rebels concluded, and O'Brien, Meagher, O'Donohue, and
M'Manus were sentenced to death. 1849. January 18, the
Corinthian insurrection against Austria and the popular risings in Germany succeeded the revolution in France of 1848, but Great Britain took no part in these
comitios. 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 26, the Act for repealing the Act for the
18th the Irish Encumbered Estates 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 the cholera,
which had been long raging in England. On November 5,
Russia and Austria demanded the expulsion or imprisonment
of the Hungarians who on the defeat of the insurrection had
taken refuge in Turkey; Turkey refused to comply with the
enquiries, and on November 7, Russia declared war against the fleet that entered the Dardanelles. December 1, the Dowager
Queen Adelaide died. December 16, a large assemblage
of tenant farmers and cottiers took place at Mullinahone in
Tipperary.
Rothchild, 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 Christ. August 5, the Act for regulating metropolitan police was passed, providing an assembly, officers, and over 2000 police, who formed the royal assent, as also an Act for the better government of the Australian colonies, forming Victoria into a separate colony, and giving it a representative legislature. August 14, the Act excluding from its Domain Diana's Mount, the residence of the Investigator, 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, 1852, when they made their way over the ice to Melville Island. November 23, 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.

January 1, 1853, Earl Grey, with a despatch places the Clergy Reserves on the agenda of the legislative council of Canada. February 4, Parliament opened, and the Queen alluded to the Ecclesiastical Titles bill, as occasioned by the pope's recent bull. February 29, the Russell ministry resigned, and the smallness of their majority against Mr. Disraeli's motion in favour of agricultural protection, and of Mr. Locke, having carried a motion against them in favour of the extension of the county franchise. On the recommendation of the Duke of Wellington the chancellor resigned his 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, declaring gold diggers without license. The discoveries of gold in some places on March 23, Rossell arrived at Southampton, on the 30th he went in procession to the Guildhall of London, where an address from the city was presented to him. November 6, the Caffres defeated a British force at Waterloo. December 22, the Prince of Wales, as representative of the legislature, visited Cavigia, Changan, Thiers, and others, and on January 2, 1852, his continued authority was voted by 7,439,316 votes against 640,737.

1852. January 1, the Roman Catholic synod of Thuringen proclaimed a church for Austria for the Catholics in whatever is their country in Ireland. February 3, the parliament met; on the 20th 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-fever of invasion by the French. April 13, Major-General Cathcart, who had superseded Sir H. Smith as governor of the Cape, issued a proclamation, recognising the independence of the Boers of the Vaal river. June 1, the electric telegraph between England and Ireland opened for communication. June 21, the independence of Greytown was guaranteed by the English and American governments. June 30, 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 held. July 19, a great Free Trade banquet held at Manchester, which was 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 assembled, the Metropolis, the Naval and Military, the Home and Imperial, the Canadian, the Colonial, the Local, and the Naval and Military. The French budget by 305 against 296; they immediately resigned; and on the 27th the Earl of Aberdeen announced that he had accepted office, and formed a new ministry.

1853. January 5, the Emperor of China legalised the importation of opium, in order to make it contribute to the revenue. March 9, a treaty with the Caffre chiefs was concluded by General Cathcart at King William's Town. May 3, Prince Mzenziko presented the Russian ultimatum to the Turkish government, claiming for the sar there, the protectorate of the Greco-Turkish and the Russian empire. The Russian mission 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 to the relief of Turkey in the event of war against Russia. October 25, 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. 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 facilitating 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 enabling the American tax, on account of the war with Russia, received the royal assent. August 7, the act regulating Oxford University received the royal assent. August 16, Bomarsund was surrendered to the allied fleet. September 14, the allied army landed in the Cimes, after scattering the Russian forces by fire and sword, and leaving the country in the preceding month. On the 15th the Russians evacuated Moldavia, and the Danubian Provinces were garrisoned by the Austrians. On the 20th the battle of the Almas took place, and the Russians were defeated. [AGLAN, LORD, &c. ; SAINT-CHANT, MARCHEAUX, &c. ; S-car, Lord.] On September 27, Sebastopol commenced. November 5, the battle of Inkerman, when the Russians were again beaten. On the 14th a violent storm destroyed many ships laden with stores, and on the 15th the fleet was dispersed. December 1, the 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 deficient. Great dissatisfaction was expressed at home, 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 superintend the hospitals there. On January 6, 1855, conferences between the plenipotentiaries of England, France, Austria, and Russia, were opened at Vienna. Lord John Russell was the English plenipotentiary, and his conduct in supporting the propositions of France and Austria for the preservation of the integrity of the Turkish empire, and in the parliamentary discussion on July 6, and led to his succession 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 succeeded by one of which Lord Palmerston was the Premier. March 2, the Emperor of Russia died, which was succeeded by his son Alexander II. May 24, Ketch cured by the allies, whose fleets swept the sea of Azof, and destroyed several towns and a vast number of vessels. June 18, the French attacked the Malakoff and the English the Redan, but were repulsed. July 15, a sudden assemblage of persons took place in Hyde Park to protest against Lord G. Grosvenor's Sunday Trading Bill, and some rioting occurred. The bill was withdrawn on the next day, but the meetings continued on the Sundays. July 11, Sweborg, in the Gulf of Finland, was bombarded by the allied fleets. August 14, the Metropolitan Local Management Act, constituting a representative board for the management of the improvements of the whole London sewage system, was passed. August 24, the French captured the Malakoff, and in the night the Russians evacuated the south side of Sebastopol, of which the allies took possession. September 29, the Russians assaulted Kars, and were repulsed by the Turks, assisted by Sir W. F. Williams, several other English officers, and General Emmet. Octo-
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. and was increased on the 12th 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 F. Peel's Bank Restriction Act was suspended for the second time, on the 23rd the Governor of the Bank gave it up to note issues to an 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 lowered, to 6 per cent., the bullion in the bank increased from 6,666,000l. on November 11, 1857, to 17,617,283l. on March 3, 1858. The effects of the failures abroad, however, which had extended to Hamburg, and most other of the commercial towns of Europe, had a most calamitous influence on the manufacturing industry of the country.

On January 14, 1858, an atrocious attempt was made to assassinate the Emperor of the French, by casting explosive balls among the crowds he was seen to pass at the Champs-Élysées and Opera. The criminals, Orsini, Pérée, Rodic, and Gomez 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 Paris in aid of the claims of the English Government to a letter was sent 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. Some fault being then assigned to Great Britain for having brought in a bill to remedy this asserted defect, which was ordered to be read a first time by a large majority; but on the motion for the second reading, Mr. Milnes-Gibson moved that the bill be sent to a committee of the whole house, was answered by the ministers, and the amendment was carried, on February 19, by a majority of 294 to 216. In consequence of this vote Lord Palmerston announced at the House on February 23, that the ministry had resigned: that the Earl of Derby had been sent for by the Crown, 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 Dr. Bernard, for the asserted 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, 1858. After a protracted and indeterminate trial, he was found guilty on the 20th of April, and sentenced to death by firing six days after. The capture of Canton, the war in China [China, S. 2] almost ceased; and since the reduction ofLucknow [Indian Empire, S. 2], the chief military operations have been the taking of detached forts or towns, and the pursuit and capture of isolated bands of insurgents. On the 16th of October the new Chancellor of the Exchequer (Mr. Disraeli) introduced his 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 Oath Bill was again carried in the House of Commons, but was rejected in the Lords, so far as it disturbed the constitution. On April 16, another attack was made on the Government, Lord Cardwell introduced a motion of censure on the ministry for having made public a despatch from Lord Lombborough, as President of the Board of Control, to Viscount Canning, Governor-General of India, condemning the proclamation issued by him. Lord Cardwell then moved an amendment, disapproved of the publication, Lord Lombborough resigned, and 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. Victoria is the southern extremity of the continent, extends between 34° and 39° 59', 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 passing through the islands of Lord Howe, King George, S. by Bass's Strait and the Pacific Ocean; and W. by South Australia, from which it is separated by the meridian of 141° E. long. The form of the province is triangular, its greatest length being from east to west about 800 miles; its
greatest breadth about 300 miles. The area is 88,000 square miles or nearly 63,000,000 acres. The population in 1846 was 32,500; on March 30, 1851 it was 77,345; on December 21, 1852, 192,637. In February, 1856, Bradshaw's "Monthly Guide to Victoria," gave the total population as 430,650, including 33,285 Chinese and 17,689 aborigines. In 1855 it was estimated that the population of the colony was 208,546, of whom 20,546 were Chinese; in this time of China 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 southerly 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 number of salt-water lakes. In the extreme north of Wilson's Promontory is a large inlet, called Alberton's Inlet, a narrow estuary which has been formed. The inlet is full of shoals, but it forms a harbour for small vessels, and maintains considerable intercourse with Hobart Town, exporting sheep and fat cattle from the adjoining country. Cape Nelson is a number of small rocky islands, forming a continuation of the ridge of the Australian Alps. From Wilson's Promontory to the western boundary of the province, the coast-line runs in a north-westly and westward direction, which arises from the entrance of the Swan River. Three small harbours are found on it—Portland Bay, near the western, and Port Phillip and Western Port, near the eastern extremity. Between Portland Bay and Port Phillip, a distance of more than 45 miles, there are no islands or shoals which present a danger to vessels, with the exception of Warrnambool and Port Fairy, small harbours for coastal vessels. During the summer the south-westerly winds blow on this coast for three months with great force. From Wilson's Promontory to Western Port the coast is mostly high. From Portland 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.

Clarence, Goulburn, and other rivers are peculiar to Australia; at other places it is covered with 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, was called by Sir Thomas Mitchell, who first explored it, Australia Felix, 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 most western of these ridges are the Grampians, a range of mountains, and has been called the Grampians. Nearly in the centre of the Grampians stands Mount Toor, or Mount William, which rises to 4800 feet above the sea-level. West of Mount Sturgeon is 1071 feet, in height. The Grampians are surrounded with extensive forests of fine tall timber-trees of Eucalyptus.

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 Nangeela, or Glenelg, 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 and slow-flowing creeks. The hilly tract of the watershed east of the Grampians has its surface diversified by numerous narrow ridges of rocks, several round hills of moderate elevation, and many small narrow valleys traversed by clear and pure streams. In some parts the hills are covered with wood; at other 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, for the name of the French mountains. In other parts they are covered with granite, but are all grassy to their summits, and thinly wooded. East of the Pyrenees the country is more broken and the hills are higher. There are forests chiefly composed of eucalyptus and box, and a considerable portion of the hilly country, placed nearly in the north of the state, is covered with hills of lava. A very large portion of this hilly country affords excellent pasture.

Between the hilly region of the watershed on the south, the mountain region of the Australian Alps on the south-east, 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 Bayounga flow in wide bottoms, sometimes 8 or 10 miles across, which bottoms are overgrown by high trees, partly swampy or covered with lakes and ponds, and an extraordinary 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 downs and wooded valleys. A considerable distance from the banks of the rivers water is not 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 in the Snowy Mountains south of the division 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 360 yards broad and 30 feet deep 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 neighbourhood 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 collection of the gold-washing. The Avoca, Avon, and Wimmera flow northwards from the eastern side of the Grampians 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. The Yarra-Yarra, a considerable stream in Ferryns, 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 sea. It is navigable 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 Gippsland 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 Australian Alps are granite and slate. The granite, quartz, intermingled occasionally with mica-schists and various other rocks of slaty texture. Quartz, ironstone, sandstone, and clay-slate are general throughout the other hilly portions of the colony. Very fine coal can be found on the coast between Port Phillip and Cape Otway, besides tin and manganese. Rich veins of copper ore have been met with on 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 chiefly found at Ballarat, 40 miles N.W. from Geelong; at Mount Alexander, 75 miles N.W. from Melbourne; and around Lake Omeo, in the Australian Alps. At Ballarat, where the precious metal is found extensively on the range, and in the bed of the river, a curious section of the workings exhibits the following series of 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 value to the clay. The richest deposits occur in the blue-clay, which is for the most part pure quartz. It is washed from the clay by water or by floating it in the beds and is sometimes found in fused pieces of pure metal, at others incorporated with quartz-pebbles, and occasionally in rolled water-worn lumps called nuggets. The quantity found has been enormous. The purest pieces and others to the diggings was at first productive of some interest, 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 10,305,980£. In the early part of 1856 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.

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 bar of summer, sometimes very intense, is less oppressive than in many parts of Europe. Not unfrequent are sudden storms of snow, extending over 30 to 30 hours, suddenly raising the temperature to an extreme heat, but they do not occasion great inconvenience, and they are generally succeeded by a refreshing breeze from the sea. During June, July, and August, the winter months, the cold is not felt as severely as in other parts of the world. Snow falls in August, 1858, fell at Bendigo 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 the most marked and consupptive 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. The wild animals found in the province are, the dingoe, or more dog; the great gray kangaroo, which abounds in some districts; the rock wallaby, or badger; kangaroo rat; oppossum; flying squirrel; wild cat; bandicoot; sloth, or Australian bear; and various others. Among its birds are, the buster or wild turkey, which on some of the plains appear in enormous herds. The lyre-bird, or Australian phasian, which frequents the mountains of Gippsland; black swans, which abound in the neighbourhood of Western Port; the emu; magpie; peahen; and many others. The larger animals are the wallaby, Musquitos, locusts, and ants appear in great numbers in 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, and in the greater part of the sea. The important timber-trees are, the red-gum, lightwood, blackwood, pine, tea-tree, she-oak or sally, honey-suckle, and ironbark. The kangaroo apple-tree, the grass-tree, and the quandong are valued for their fruits. The fig, which is the most prolific tree, and the dates which have been successfully cultivated are, the peach, plum, quine, nectarine, apricot, pear, apple, mulberry, almond, and fig. Several vineyards have been formed. Vegetables are abundant. The potato, turnip, carrot, cabbage, broccoli, and radish, grow to an enormous size. Cabbage and flea are indigenous. The tobacco and castor-oil plants and Indian corn grow luxuriantly. The common cereals are produced in great perfection; wheat is of the finest quality, with a return of their heads of 50 to 60 bushels per acre.

The climate of Melbourne is equal to any part of Australia 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. The great bays and lagoons are the best roads for the export of wool has for some years very rapidly increased.

The settled part of the province, comprehending principally the eastern and southern portions, is divided into 34 counties. Melbourne, the capital of the colony, is described under Macaconnell, & c.; but we may add here that in 1834 the receipts were 650,864£, of which a great part was raised on loan; and the expenditure was 659,772£, of which 291,504£ were expended on public works in the city. There are 8 daily newspapers. The great hazy climate is very prejudicial to the health of the inhabitants. The papers published in the colony, the greater number of them in Melbourne. Most of them are of a large size, expensive; well printed, and some of them edited with great ability.

The second town in the colony is Geelong, now an important shipping port, pleasantly situated on the south-western shore of Port Phillip, at the head of Coria or Geelong Bay. It is regularly built, well supplied with water, and steadily advancing in population and trade. Smaller vessels enter the bay nightly, and nearly every country town has its representative in the town. Port Henry, 10 miles down the bay. The increase of the town of Geelong consequent on the gold discoveries is shown by the town revenue in 1851, 1853, and 1854, which was thus: 1851—2,974£. 4s. 1d.; 1853—10,997£. 16s. 1d.; 1854—11,341£. 14s. 6d. Geelong is now a large and important beginning of a railway at the north-eastern coast of Port Phillip, which is about 120 miles from Melbourne. The railway to Geelong has been constructed. Near the mouth of the Yarra on the north-eastern coast of Port Phillip, the nearest village
of St. Kilda and Brighton, which are resorted to as bathing places by the citizens of Melbourne.

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, and surrounded by some whaling establishments in the place, and the wool and other produce of the neighbouring districts are shipped at the harbour, which is inconvenient and exposed. 

Belfast, an active and thriving town, is situated on Port Fairy, some miles east from Portland, and is one of the most important of the large shipping and wool ports of Victoria. A Presbyterian church was opened here in the early part of 1855. 

Bellarine, the seat of the gold-diggers 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, Beecroft, Benalla, Bouverie, Braidwood, Carrum, Chepstow, Colac, Flemington, Kilmore, Keyneton, Mount Alexander, Port Fairy, Prahran, Richmond, Sandhurst, and Wangaratta. Bradshaw's 'Monthly Guide to Victoria' for January 1857, p. 205, gives a list of localities.

By an Act of the Legislative Council of Victoria, ratified by the Act of the Imperial Legislative Council, 18 & 19 Vict., cap. 55, it is provided that there shall be a Legislative Council of 30 members, and a Legislative Assembly of 60 members, for the term of five years, or until the next general election, as well as natural born subjects of the Queen, and possessors for at least one year previous to election of lands and tenements in the colony of the value of 500l., or of the annual value of 500l.

No judge, minister, tutor, or convicted felon, can be a member. The following subjects, or naturalised for at least three years, and possessed of freehold property of the clear value of 100l., or clear annual value of 100l., or leasehold property of 100l. yearly. Members of Parliament must be 21 years of age, possessing freehold property to the amount of 200l., or 300l. yearly value. Judges, ministers of religion, and persons who have been attainted for treason, or convicted of felony, are excluded. Electors must be 21 years of age, possessed of freehold property of the clear value of 100l., or occupy premises of 10l. yearly rent, or have a yearly salary of 100l.

After the expiration of two years from the passing of the Act 20 persons is to be appointed by the legislature to this new chamber. The leading feature of the new charters for Victoria and the other Australian colonies is that, with the exception of a few reserved points in reference to imperial rights, the business of each colony will be managed by its own legislature. In particular the management of the waste lands is committed to the colonial legislature.

The imperial authority is represented by a lieutenant-governor, whose salary is 10,000l. per annum, with an allowance of 6000l. per annum for salaries of staff, repairs to government-houses, travelling, and other expenses. The laws are administered by a chief justice and three puisne judges, who have criminal jurisdiction, and exercise the powers of the Queen's Bench, Common Pleas, and Exchequer courts. The assembly consists of 21 members, and the estimated expenditure in 1853 was 409,864l. 1s. 5d.; in 1853 it was 734,961l. 18s. 2d. The estimated income for 1855 was 3,015,683l., and the estimated expenditure 4,601,292l., showing a deficit of 1,585,609l., to provide for which a considerable amount of difficulty was experienced by the government. The estimate for the income, however, was exceeded by more than 100,000l., and the revenue, though in the year showing a considerable increase in the customs' duty, gave a large increase in the item of land sales, of 12,000l., on property near the town of Melbourne.

The number of ships entered at the ports of the colony in 1851 was 712, of 129,426 tons; the number in 1852 was 1657, of 408,316 tons. The number of ships registered as belonging to the colony on December 31st 1854 was 272 of 1,177,376 tons. The value of the goods imported into the colony in 1851 amounted to 1,425,964l.; in 1852 the amount was 7,451,549l.

From Great Britain alone there was sent to the colony in 1853 goods to the (declared) value of 7,029,526l. of British produce and manufactures. The value of the British wool re-exports and the world's foreign and colonial produce and manufactures.

About 21,000,000 lbs. of wool was imported into Great Britain from Victoria colony in 1853. In 1854 the imports had risen to 17,638,051l., but sunk to 12,907,926l. in 1855; while the exports had risen in the two years from 11,777,304l. to 12,493,383l. The imports again decreased in 1856 and 1857.

Port Phillip was discovered and entered by Lieutenant John Murray in January 1802, and was soon after visited by Captain Flinders, who called it Port Phillip, in honour of the first governor of New South Wales. Although occasionally visited in succeeding years, it remained without any settlement until 1839, when the directors of the Sydney Company established a settlement there, and took place in the Australian colonies. A settler from Van Diemen's Land having purchased an extensive tract of country from the natives, the government refused to recognise the validity of the purchase, and the entire district adjoining Port Phillip was purchased by the natives of Van Diemen's Land, bringing their flocks with them, arrived in great numbers. The New South Wales squatters, with their flocks and herds, came from the north. The district rapidly advanced in population and wealth, and was annexed to New South Wales in 1826, and was the governor of New South Wales, till, after repeated representations on the subject, it was, in 1850, separated from that colony, and constituted a distinct province. The bishopric of Melbourne was founded in 1847; the diocese comprises the colony of Victoria. There is one archdeacon, of Geelong.

VICTORIA. [Hono Kono, S. 1.]

VICTORIA REGIA, a species of the natural order Nymphaeae. [NympHAEACEI.] This splendid plant, in the original dimensions of the flower and the brilliant color and fragrance of its flowers, may deservedly be called the queen of flowers. The following is the account of its discovery by Sir Robert Schomburgk:—"It was on the 1st of February, 1854, that Sir Robert Schomburgk returned to the Equator from the northern parts of Brazil, and his companion, Captain Fagoaga, arrived at the mouth of the Rio Negro, opposite to an island, which was inhabited by the negroes, and which is called Guiana. The river is about ½ mile broad, and was filled with passengers on board a large native canoe. The bank at the mouth was covered with blossom, and as I rowed from one to the other I always observed something new to admire." The leaves are very large, measuring five or six feet in diameter. They have an orbicular form, the upper surface in bright green, and are furnished with a rim round the margin from 3 to 5 inches in height; on the inside the rim has a green colour, and on the outside, like the under surface of the leaf, it is protected by a bright red. The flower, which has a rather large petal, is about an inch high, radiating from a common centre; these are crossed by a membrane, giving the whole the appearance of a spider's web; the whole leaf is beset with prickles, and when young is convoluted. The stock of the flower is an inch thick; the petals with prickles, each sepal is 7 inches in length and 4 inches broad; the corolla covers the calyx with hundreds of petals; when first opened it is of a white colour, but subsequently changes to...
VIDOCQ, FRANÇOIS-JULES, the chief of the detective
brigade (Brigade de Sécurité), at the prefecture of the Paris
police, established in 1819, whatever must be thought of his
early life as a thief and inmate of the convict yards, un-
doubtedly 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 depart-
ment 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 acquaintance who led him to partake
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 neighbour-
ing wine shop. A watch was at length set over him; which
did not prevent his stealing ten silver forks and spoons, and
pledging 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
800. 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 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 pen-
iten returned home, and a kind old priest prevailed on his
father to forgive him and receive him. This was in 1793,
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
Bourbon, 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, on
November 6, 1792. Having distinguished himself at the
capture of Longrivy, under Kellermann, October 20, 1799, and
being of unusual stature for his age, he was made a corpo-
ral of grenadiers. A day or two after he was recognized
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
twice. 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 ‘Moderé,’ and thrown into
prison. However he was soon after released, owing to the
good offices of Mademoiselle Chevalier, the daughter of the
notorious Joseph Lebon. He married her in 1793, but
they separated almost immediately. The next year he went
to Brussels, became a professed gambler, made love to a
countess under a feigned name, 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 love 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 sen-
tenced to eight years’ penal servitude at the galleys. As
they conducted him, bound to the chain, he excited a revolt
among the convicts, but the attempt to escape having failed,
he reached Brest, and remained six years at the barge. 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 Ambricourt, near Lille. He was soon re-captured,
and sent to Toulon. From this convict-yard, he 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 malfactors having
detected the brand of the convict on his shoulder, disarmed
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 magistraté, to whom he offered to give such intelligence as would enable him to surround his late comrade, but only to the extent of plagues. For this purpose, he applied for a temporary release. But the magistraté 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 provision of a passport?" The magistraté shrugged his shoulders in a manner which would seem to intimate that he had no cause to fear. 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 reputation of the great wire-puller. In 1806, again, when he maintained himself by following the handicrafts 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 had. On one occasion they borrowed his cart, to convey the body of a murdered victim to a place of safety. He tried to follow them, but they were too quick for him.

In 1809, driven to extremity, Vidocq presented himself before M. Henri, the commissioner of the secret police of Paris. He acknowledged his condition, and offered to give various services which he might be called upon to perform, and go freely. This proposal was not accepted until his 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 perseverance and, at times, by his adventure; besides that spirit of sang and bant, which is the eloquence 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 those whom he had formerly attempted to rob, and 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 Belleville, and Follaré, the robber who afterwards stole much more than 15,000 with the help of the subfusc at the latter's, was handed over by this secret agent to justice. La Courtois, a sort of St. Giles's, infested with the worst vagabonds, was purged; the great burglar, Desnoyers, and thirty-two of his accomplices, were taken. About the same time, the famous brigade of detective police (Brigade de Sûreté), directed by Vidocq, was formed, consisting at first only of four men; in 1817 the number rose to twelve; and in 1824, when its complement was full, it contained twenty-eight detectives. "It was this minute force," says Vidocq, "that I had to watch and look after 1900 returned transportes, and issue every year from four to five hundred writs."

In the single year 1817, he effected 773 arrests, and 32 seizures of stolen goods. His useful work attracted the notice of the Minister of Police, and of which he was notified by the Secretary of 2002. During the whole 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 robberies for the sake of arresting his dupes, and of those who shared in the plunder. This obloquy rose so high as to alarm the government, and in 1825 he was superseded in his functions by Lacour, whose antecedents resembled his own. In 1826 he established a paper 201 factory at Saint-Mandé; and in 1827 he moved to the United States, and conducted a paper mill in Paris, by the bookseller Tenon, in 1829, in 4 vols. In 1831-32 he was employed to detect some of the political agitators of the day, but his vocation was not either permanent or lucrative. In 1838 he handed over his 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 questionnable character, which had appeared in London, he republished his Mémoires, under the title of 'Les Vrais Mystères de Paris.' The morbid taste for notoriety of any kind which then prevailed, and the name of Vidocq, which had exhibited himself, with many curious articles used by French burglars, in the rooms of the Cosmorama in Regent Street. But this speculation 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 moderate property, and of that stern disciplinarian, was himself Alexandre's earliest instructor. In his youth, his studies were chiefly directed to theology, he having been devoted to the service of the church; but then, as throughout life, literature possessed for him a predominant attraction, and so diligently had he laboured in this 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 married; in 1823 he resigned his connection with this movement and with the proceedings of those opposed 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 remained at Basle, and for several years M. Vinet was one of its chief contributors; and in 1837 he published a selection of his essays contributed to it, with other missellaries, under the title of Essais de Philosophie Morale. In 1837 Vinet was invited by the authorities to take the chair of the lectures on the history of the native city of Lausanne, and, with some regret at leaving Basel, he accepted the invitation. The religious discussions in the canton had decided the government to appoint a commission, who were to draw up a new constitution of the church, and M. Vinet was elected a delegate for the class of Lausanne and Vévey. He took 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 1826, been approximating 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 fact. His work was translated into English in 1843 under the title of An Essay on the Profession of Personal Religious Conviction, and upon the Separation of Church and State, considered with reference to the Fulfilment of that Duty. But, as Vinet was far from being the barbels who, by the adhesion of a whole class of notaries adhering to his own views, he exhibited to 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 amendment 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 manuscript of his book, "Lettres," whose preface was severely on his frame, already enfeebled by protracted ill-health. He continued however with increased diligence his professional duties and literary studies till his powers gave out; he died on the 10th of May 1847.

A list of the chief works, not already mentioned, of M. Vinet, will sufficiently indicate the character of his mind and the range of his pursuits. Among his theological works may be named his "Discours sur quelques sujets religieux," a discourse delivered at a funeral sermon in 1845, and "Nouveaux Discours, &c." (1841), from which two works selections have been translated into English and published in America and Edinburgh under the title of "Vital Christianity," and the posthumous publications "Théologie Pastorale," and "Hémiplégie ou Théorie de la Prédestination," of both of which English versions have appeared; "Liberdres religieuse et Questions ecclésiastiques," "Études sur Blaise Pascal," "Études Evangeliques," and "Nouvelles Études Evangeliques," which have been rendered into English as "Gospel Studies." His two chief literary works are his "Histoire de la Littérature Française au XVIIIe Siècle," 2 vols., which appeared in an English version in 1854, and "Études sur la Littérature Française du XVIIe Siècle," 3 vols.; 1, "De Stael et Chateaubriand;" 2, "Poètes Lyriques et Dramatiques;" 3, "Poètes et Proseurs." All these works are accurate reflections of the mind and character of the author. Pure in sentiment, evident in purpose, clear and direct in style, brilliant rather than profound in thought; and everywhere pervaded by an earnest and conscientious spirit, they are works which will be read with pleasure and respect even by those who differ widely from their opinions. As a preacher, M. Vinet bore a high character for eloquence and earnestness; and as a teacher, he greatly increased the reputation of the schools of Basel and Lausanne, while his personal character was in every way admirable.


Math in [Volk].

VIFER'S GRASS [SCHRÖNHA, S. 2.]

VISCONTI, LOUIS JOACHIM, son of Ennio Quirino Visconti, was born at Rome in 1797. His father was compelled at the close of 1799 [Visconti, E. Q.] to remove with his family from Rome, where the young Visconti was care fully educated. Having selected agriculture as his avocation, his father, as soon as he was of sufficient age, placed him with the architect Percier [PERCIER, CHARLES, S. 1], so well known by his works on the Louvre, a building with the parts of which he was identified, and much of it is still associated. Under Percier, Visconti made a distinguished progress, carrying off at the Architectural School five medals, and a second prize for the plan of a library. Shortly after the termination of his studies, he obtained an appointment as inspector of public buildings; and subsequently that of architect and surveyor of the third and eighth arrondissements of Paris, an office he held for above a quarter of a century. He was further, in 1825, appointed architect of the Emperor and he then devoted himself to less than twenty-nine plans and elevations in the hope of being directed to give to that building an architectural character equal to the grandeur of its contents, but his ambition was not gratified. Although not called upon to construct any important edifice, M. Visconti found ample employment in connection with the offices he held; and to him was entrusted some of the public monuments with which Paris has of late years been adorned. Several of the finest works are among his, as, for example, the Place Louvois, Gaillon, and Mollière, were executed from his designs. The tomb of Napoleon I. is also by him, and is his grandest work of the kind, but he also designed the monuments of Marshals Soult, St. Cyr, Suchet, Lauriston, and those of the eminent officers of Napoleonic times. He was likewise called upon to design innumerable triumphal arches and other temporary structures for fêtes and occasions of public rejoicings and ceremonies, and his taste and fertility of invention were generally admired. He also designed several hotels and private residences. But the work with which his name will be most permanently connected is, perhaps, the completion of the Louvre, and its connection with the Tuileries. The Emperor Napoleon III. having decided on completing this the most magnificent of the sacred edifices, he was directed to prepare the necessary plans, and these 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, 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 Tuileries was inaugurated with great pomp by the Emperor.

VITALITY, a term equivalent to vital life, and applied to the properties of those bodies, fast, living, which are of life in plants and animals. Life in animals is 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 distinct from the fact of growth, and the latter is naturally made for a definition of life. It is often assumed to be a set of actions under the controlling influence of a 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 processes in which the living bodies, or minerals. Coleridge, in his 'Ideas of Life,' contends that the collective activities of the mineral 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 forces which regulate 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 it is impossible to be reconciled. This term 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.

This term has been thus far, however, only regarded as a vital process; also the contrivability 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 Organising Force, the Plastic Force, the Assembling Property, and the Metabolic Property. The contrivability of the muscles has been properly called Muscle-Force, whilst the sensibility of the nerves has been called Nerve-Force.

The physical force dependent on Physical forces is seen in the fact that plant-cells will not grow without light. Muscle-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. It is not impossible that this may be the case. But he has rendered it probable that, with regard to muscle-force and nerve-force, they are but differentiations or other manifestations of the physical forces. Muscle-force and nerve-force depend upon the destruction (chemical change) of cells which is produced by the heat and light; and the sensitiveness of men, as affected by the influence of heat and light, is produced by the carbonic 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 have the power of making certain 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 mind is essential to the ever-active changes which go on in his body through the agency of the vital forces. [Muscles, nerves and nervous system; motions of plants; vegetables, vegetable kingdom.]

Mattiucci, Electro-Physiological Researches, in Philosophical Transactions; Mattiucci, 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 Reviews, vol. XXX.

VIVIANACEAE, Vivianites, 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 Tirosaccus and Troposaccus. All the species inhabit Chili and South Brazil. There are 4 genera and 16 species.

Mr. Busk and Professor Williams, in the first volume of the new series of the ‘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 central embryonic mass of which the outer wall of the granule 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 the two forms are very frequently to be met with interspersed, and on several occasions I have observed smooth and stellate globules in the interior of one and the same parent globule.

The other globule, described and named by Ehrenberg, under the name of Sphaerostoma Volvax, 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.

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slow and gradual. This contraction of vascular spores has ever been observed by Cohn in a species of \textit{Protococcus}.

Mr. Booth sums up the result of his observations upon \textit{Volvoc glabrer}:

1. That it originates in an apparently nucleated discoid cell, which is generated in the interior of the parent, and liberated in a perfect though not fully matured form, within which are contained similar germ-spores. Just as

2. That the contents of this apparently nucleated discoid cell, consisting of a granular material, and refractive amorphous forms, after a time undergo segmentation, at the same time exhibiting a distinct wall, beyond which is a delicate annulus, apparently of a granular consistence.

3. That this segmentation, attended with a corresponding augmentation in the number of the refractive spherules, terminates ultimately in the formation of numerous conglutinate 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 undergo segmentation, which is continued upon an elongated hyaline beam penetrating the parent cell-wall, and exert active movements external to it.

6. That in a concentric plane internal to these ciliated zoospores, is placed the germ of future individuals destined to follow the same line.

VOROSMARTY, MIHÁLY or MICHAEL, an eminent Hungarian poet and prose writer, was born at Nyír, in the county of Fejérvar, called by the Germans Stathweisensee, in the year 1800. His father, whom he lost early, was stewart to 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, 'Nothing Sigismund,' between which, in 1822, was published his romantic poem of the 'Triumph of Fidelity.' It was as an epic poet that he attained the greatest celebrity; his 'Zalan Füzes,' or Flight of Zalan, his 'Cserhalom,' and his 'Tündervölgy,' 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 Gyülekez,' 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 much concerned with Bajza and Schedel in the editorship of the 'Atheneum,' a periodical not unlike the London 'Atheneum,' 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 labours and literary studies. General his reputation is good higher among the educated classes than among the people; but one of his lyric poems, the 'Szózat,' 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 the Hungarian Academy presented the poet with a ducat for every line. Some of the lines of the 'Szózat,' the subject of which is the fate and prospects of the Hungarian nation, have since acquired a melancholy increase of significance:

'For some there will be, and some there must,
To us a better time.
And if it come not, then come Death To end our dark career.
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 'Szózat' should be called on to take a part, and he was elected deputy for the county of Bacska. His course in the Assembly however was far from meeting the approval of some of the more fiery patriots. The pepeis and impetuous Petőfi, the Hungarian Burns, was so indignant at one of Vörösmarty's views that in a poetical address to him he remonstrated with him. The 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 time. He was, however, an exile for twenty years by the calamities of his country, that he sunk into a deep melancholy, and lived for two or three years in retirement, without suffering pen and paper to come in his sight. At length, in 1864, his friends roused him in some degree from this state of depression, and he undertook a translation of Shakspeare, 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 division adopted for the writings are Lyric Poetry, Narrative Poetry, Dramas, More Recent Poetry, Novellas and Tales, and Miscellaneous Writings in Prose, which are subdivided into Essays on Language and Literature, and Dramatic Criticisms. The whole are comprised in one thick octavo volume, printed in six columns, but would occupy nine or ten ordinary octavos. Vörösmarty's writings are more distinguished for classical correctness of form than for striking originality of substance. His narrative poems are written in hexameters and 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 beauties difficult of transfer.
directors, were averse to the project. But in October 1839
Lord Ellison, the Board of Control, and
Mr. Loch, chairman of the Court of Directors, engaged him
 początkowo para tekstowej

by any European. The population of the colony was esti-

ated in 1836 at 366,100, of whom 147,081 were males.

Surface, Climate, etc.—The climate of this country is very peculiar. The interior consists of wide

plains, interrupted only by comparatively short ranges of

high hills or low mountains. The waters collected in these

plains are at first of a cloudy appearance, and embogues within the territories of South Australia.

On the east and south the plains are surrounded by higher land, which constitutes the watershed between the rivers joining the Murray and those which run into the sea. This waters-

hed is in general about 100 miles wide.

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 southwards, become confluent and form it into a river, having abundance of 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 Warrangong Chain, the Murrayumble and its affluents takes its source, and is likewise a personal river; and east and north of this are Yass Plains and the hilly tract including Lake George. The elevated plains extend, under the name of Oolbourn and Breadalbane Plains, about 40 miles farther to the east, and Honechurch, which is the De-

doon Range, which constitutes the southern part of the Blue Mountains, east of which runs the Shoalhaven river to the sea. The Blue Mountains commence in 34° 30' S. lat., and run northward to the Monondulla Range, in 32° 40' S. lat. From this range the side descends to the Wollondilly and the Macdonald rivers, all of which find their way to the sea through the Hawkesbury at Bullen

Bay; on the west side descends the Lachlan and its affluents, which join the Murryumble. The mountains are of sandstone, except the northwestern part, which

attains a height of 3400 feet above the flat country. At the distance of 80 to 70 miles north of the Monondulla Range is the Liverpool Range, running east and west. This-range extends to 100° 30' E. latitude, and the northeastern part of Liverpool Plains, between 150° and 151° E. long. In these parts its southern slope rises with a precipitous acclivity, and in some places nearly perpendicular above the plains which lie south of it. Its elevation is probably 1500 or 2000 feet above the base. Where the slope is not too rapid it is thinly wooded. On account of the steepness of the ascent, only two places have been found at which it can be traversed with ease: the western called Pandora Pass, near 150° E. long; and the eastern called the Murray, which dis

101° E. long. When the summit of the passes is attained, a short descent brings the traveller to the Liverpool Plains. A ridge from the Monondulla Range to these mountains divides the affluents of Oolbourn River, a tributary of the Shoalhaven, into the Hunter and the Colo. The latter

passes through Cudgegong and Talbragar, which fall into the Macquarie. A considerable portion of this ridge is without trees, overgrown with bushes, and grassy; but on the rising grounds are forests composed mostly of apple trees, iron-bark, stringybark, and box.

The coast-line on the east extends in a general direction of north-north-east from Cape Howe to Cape Byron, when it recedes a little to the west. There are numerous harbours formed by the mouths of rivers flowing into the Pacific. The chief of these, proceeding from south to north, are—Twofold Bay, at the mouth of the Towamba, immedi

ately north of Cape Green, one of the boldst promontories along the coast; Barooga, Bateman Bay, Sussex Haven, Port Nepean, Port Hacking, Port Jackson, Broken Bay, Port Hunter, Port Stephens, Farquhar and Harrington Inlet at the mouths of the Manning and Landsdowne rivers, Port Macquarie, Trial Bay, Brisbane Bay at the mouth of the Clarence River, in 28° 0' S. lat. whereas the coast turns south and west, passing 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 usually perpendicular, but generally low; the latter, in 10° 0' S. lat., to Hunter River, north of 35° S. lat., they present a 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
outside. In some parts especially north of Trial Bay (26° 50' S. lat.) and south of the mouth of Clarence River, are tracts of coast many miles in length, where it is rocky and irregular, and of considerable elevation. The brooks 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 depressed, and which are bridged by country-level in the direction of the river. There are several small streams, however, which, though narrow, are navigable for small boats. The Shoalhaven River, the most southerly of the considerable 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 100 miles north from the mouth this river is very rapid, up to which the tide flows. The mouth of the river is much obstructed by shoals and sand-banks. The Hawkesbury 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 rapid occurs near Windsor, from which place it is navigable for moderate vessels. With the shoal, it rises in the direction of the coast from the mouth of the river, and at 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, lying between the headlands of East and West Pittwater, in the straits of Pittwater, and extending to the head of the bay. 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. _George's River_ falls into Botany Bay. It runs hardly 60 miles, but is navigable for boats from Liverpool, downwards, 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_ Macleay River, _which rises in the Highlands, the other in the connecting ridge, and both have very tortuous courses. The navigation begins at Maitland, about 20 miles from Port Hunter by land, but nearly 40 miles by water, and a steamboat plies regularly between that town and Sydney. This river often rises rapidly after heavy rains, and in some places to the height of 80 feet.

The navigable rivers which drain the countries north of the Hunter are the Manning, Hastings, Apeley, Clarence, and Murray. The Murray, which is 240 miles long, flows virtually 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 swift current, which sets from the land. The bar is formed by shoals on the northern side of its entrance. Outside the bar is a sand-bank for about 12 miles, and the summit of the largest cricket, 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 Apeley 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 19 to 17 feet of water upon it. This river is navigable to a distance of more than 50 miles from the sea, when 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 place 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 Shoal Bay, 29° 20' S. lat. The bar across its entrance has 12 feet of water upon it, at high tides. _Brisbane River_ flows into Moreton Bay, and is navigable by ships drawing 16 feet of water 50 miles up, at which point a ridge of rocks crosses the bed, but to a distance of 12 miles from the sea, which is navigated by boats. Several of its tributaries are also navigable, by boats, 80 miles from their mouths. The country on both banks of the river presents an alternation of hills and level tracts. The soil is very fertile; it is well watered, and contains good pasturage. The highest hills lie on the north side of the river, where some rise from 700 to 600 feet. The fairest 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 headland of Mount Mitchell, which is 4130 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 system are very extensive, flowing westward from 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 Cliff and Flinders Ranges, where it enters South Australia at 143° E. long. The Darling, by its upper branches, drains the country east of the Great Australian Plain, and the Condamine, rises on the Darling Downs, in 28° S. lat., runs northward as far as 26° S. lat., 151° E. long., then turns westward to 149° E. long., and then south-westward till it joins the Darling on its other bank. From the south 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.

The following is a general 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 of New South Wales by W. J. Brooke, in his discourses in the standing of the Australian mountains 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 mixed with quartz and schistose slate; but it was not till 1849 that the actual existence of gold was discovered. In 1851 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 found the gold for himself. On Mr. Mawson's instructions were given by the governor to grant licences to diggers at 3 oz. per month. The first discoveries 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 river- or sluice-washing the Government would recover half. 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 occupations abandoned, and thousands of persons flocked to the diggings, where all labour repaired to the diggings. An immigration ensued almost without a parallel.

Respecting other metals we have little to add to 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 worked, 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 River. On some parts 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, grapes, pineapples, gooseberries, currants; almonds, walnuts, peachstones and bitter almonds, which grow at the colder and more elevated countries, as near Bathurst. In the kitchen-gardens are raised melons, water-melons, pumpkins, capucins, cabbages, turnips, and some other vegetables.

The wool is a principal product of this country, and is exported 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 consider- able expense importing sheep, which has been much improved. The wool imported into Great Britain from New South Wales in 1855 amounted to 17,671,664 lbs. The breed of cattle is a mixture of the Belgian and red stock, with hogs, the admixture of which has been considerable. The cattle and sheep are driven into the interior, and the various English breeds which have been 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 fatigue. 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 banana climate. The climate of this country is very stimulating, and there is a great demand for the product of the land, and a great demand for the product of the land, and

Poultry is in great abundance: geese, ducks, turkeys, guinea-fowls, and common fowls thrive surprisingly, without any particular care being taken of them.

The manufactory industry of the 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 manufactory establishments are the mills for grinding and dressing corn, and the manufacture of wool, flax, hemp, and cotton, and the manufacture of woollen-wool, hats, huts, corn, and of articles of furniture; distilleries, breweries, iron and brass-foundries, rope-yards, and ship-building yards. As sperm-whales and blubber are very frequent in the waters of the sea around the coast, the entries of Base'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 has become 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 sheepkins, Great Britain imported from New South Wales, in 1854, to the value of 4,050,109s.; and exported articles to the value of 6,981,003s. These amounts have decreased in the years 1855 and 1856, but are still very large. Considerable quantities of wool are exported to the United States.

Divisions of the Country.—The more closely-settled portion of the colony is divided into 37 districts, 21 of which were added in 1847. Out of these are formed 40 counties, of which the first settled 21 are conterminous with the districts. 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 thereon to the same extent. The county of New South Wales on the south, and the county of New South Wales on the north, and the county of New South Wales on the east, and the county of New South Wales on the west, with the same limits, followed the discovery of that fine pastoral country the Downs of Bathurst. In the following years a practicable line of road was constructed over the mountain range by convicts. Mr. Oxley, in 1817, began the task of exploring the interior. Since this period some portion of the country has been nearly every year discovered and explored. Among the discoveries may be particularly mentioned Allan Cunningham, Lieut. Sturt, Capt. Strelitzka (who first ascertained that gold was to be found in the mountains), Mr. Oxley, Capt. Sturt, Strelitzka, and Dr. Leichardt, 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 of great service to the geographical notices of Australia in the several colonies.

The system of transportation has been discontinued of late years.

Towns.—The capital is Sydney. Bathurst is a thriving town, 188 miles W.N.W. from Sydney, on the west of the
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 pasturage, 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. 

Bundanoon, a small but rising port-town, near the southern border of the colony, on the mouth of the river Towambas, which here falls into Twofold Bay. 

Brisbane is at the northern extremity of the colony, situated on the river Brisbane, navigable for some miles from the sea. It is a flourishing town, in an agricultural district. Tobacco and wine are produced. 

Campbellton is on the coast, about 20 miles S. from Sydney, and has considerable trade and manufacture, particularly of leather. 

Liverpool is about 16 miles W. from Sydney. The town is 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 Wallis creek. 

The river Hunter is navigable. 

The collieries in the neighbourhood have greatly contributed to the prosperity and increase of this place, which is properly two towns, East Maitland and West Maitland. In East Maitland are a court-house and jail, and in West Maitland are numerous premises of different kinds. A railway runs regularly from Maitland to Sydney. 

Newcastle, about 70 miles N. by E. from Sydney in a direct line, is built at the mouth of the Hunter River, which forms a harbour deep enough for merchant vessels, but the entrance is narrow and crooked. The town owes its importance chiefly to the collieries in its neighbourhood, which are extensively worked. 

It gives title to a bishop. 

Paramatta is situated at the mouth of the small river Paramatta, and at the head of the harbour. 

It is 150 miles from water, and 15 miles by land from Sydney. The principal street is a mile long; at the end farthest from the harbour is the country residence of the governor of the colony. Daily communication is kept up with Sydney by means of stage-coaches and steam-boats. The observatory at Paramatta (founded in 1821) was the private property of Lieut.-General Sir Thomas Brisbane, an active and well-informed astronomer, during his residence in the colony as governor. At his return to England, the government adopted it as a public establishment, and it is now under the superintendence of an observer appointed by the Admiralty. At Paramatta and in the vicinity are numerous lunatics, one of which is for convict lunatics and invalids. 

WindSOR, about 30 miles N.W. from Sydney, stands on the right bank of the Georges river, which is navigable for a few miles above the town for coasting vessels. This circumstance and the fertility of the country which extends along both sides of the river above the town have raised it to some commercial importance. There are at Windsor mills for grinding grain, breweries, and tanneries.
WALLACH, 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 study under the direction of Professor
Hortensius, and went to India in 1807 at the age of twenty-
years. He was appointed Director of the Botanical
Institution and to the Danish settlement in Sermapora.
In 1816 he was nominated to the temporary charge of the
Calcutta Botanic Garden, which appointment was subse-
cuently prolonged to two years. He found a botanist,
Dr. Fleming, Mr. Colebrooke, and Sir John Banks.
Dr. Wallach'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
garden. He afterwards visited Ceylon, the Deccan, and the
quantity of hitherto unknown and beautiful plants. In 1820
Dr. Wallach 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 few years later, caught
on 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 on the last day of the year 1822, rich in botanical
collections and with renewed health. In 1824 he
commenced the publication of a selection from his Nepaul
collections under the title of 'Vestnetum Flora Nepalesiana Illustrata,' of which two numbers, containing 20 plates, were
published. The edition was quickly exhausted. In the same
year he published a new art of lithography in India, and both
drawings and lithographs were executed by native artists under
Dr. Wallach's direction.
In the same year he was appointed by the government
to explore the timber forests of the Western Provinces, and
availed himself of this opportunity to examine and collect
plants in the kingdom of Oude, the valley of Degra, &c.
Excursions to other parts of India were undertaken at
short notice, the number of which enabled him to still
further to increase the immediate stores of botanical treasure
he had accumulated. His health had now however suffered
so severely from repeated attacks of illness that in 1828, he
visited England, bringing with him the great bulk of his col-
cctions. When he again returned to England in 1833, the
company proceeded to distribute his duplicates
amongst the public and private herbaria throughout the
world. The type collection, containing a complete series of the
species, was presented by Dr. Wallach to the Linnean
Society of London. At this time he completed his work
entitled 'Planta Asiatice Rariorum,' consisting of 300
beautifully executed coloured plates. In 1833 Dr. Wallach
returned to India and resumed the charge of the Botanical
Garden. He was elected a Fellow of the Linnean Society in
1847, when he again visited England. He was the
author of numerous papers and reports on horticultural
and botanical subjects, published in the 'Transactions of the
Asiatic Society of Calcutta,' Sir W. J. Hooker's 'Journal of
Botany,' and other periodicals. He was also a Fellow of the
Linnean Society in 1818, and in 1849 one of its vice-presidents.
He was a man of warm affections, ready
wit, and pleasing manners, and devoted in his attachment to
his favourite science. It must not be forgotten that he
died at his house in Upper Gower-street, London, on
the 29th of April 1854, in the 69th year of his age.
WALTER, JOHN, late manager and principal proprietor of
The Times, was born at Drogheda, Ireland, in 1788. He
was the son of John Walter, who was born in 1739, was known as the
ogrographic printer, from his having obtained a patent for an
invention named Logography, or the art of printing with
single words. The undivided management of single letters. On the 1st of January, 1788,
he published the first number of 'The Times,' and was
fearing eight years printer to the Board of Commons, but
has employment was taken from him about 1805, in conse-
quence of the appointment of a new Poor Law Commissioner. In 1814 he
was 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 polls opened. He was returned for the
Residence, Printing-House Square, Blackfriars, London.
WARBURTON, ELIOT BARTHOLOMEE GEORGE,
eldest son of the late Major G. Warburton, of Augh-
rim, county Galway, Inspector-General of Constabulary in
Ireland, was born in 1610: he represented a branch of an old Cheshire family. He received his early education at home and under the care of a tutor: then entered Queen's College, 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 then returned to the care and influence of his first tutor. 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 1636, and at the present time is regarded as a source of knowledge for the history of the Caliphate, which is now (1856) 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, who so chivalrously distinguished himself in the civil war under Charles I. He next wrote 'Historical Sketches of Hastings,' a reference and illustrative of the same period. Shortly afterwards he edited 'Memoirs of Horace Walpole and his Contemporaries.' His last work, which was published after his death, is entitled 'Darem,' or the Merchant Prince; it is a tale founded on the colony established about the middle of the 17th century by a Scottish adventurer named Paterson, on that portion of the northern coast of South America which abuts on the fathoms of Panama, and is known by the appellation of New Spain. In 1852 a day was dedicated to the late Mr. E. Grove, Esq. of Stonestone Park, Staffordshire, and niece of Sir E. Craddock Hartopp, Bart., by whom he left issue, two sons. He was lost in the ill-fated America, which sailed on March 30th of last year, February 4, 1852.

WARD, ROBERT PLUMER, was the eldest son 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 school under the late Lord Mulgrave and the Right Hon. Sir Charles Yorke; he served the office of Clerk of the Ordnance from the latter date till 1832, 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 1822, 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 Haslemere. Amongst all his political and parliamentary labours Ward found time for the composition of several works of history and of fiction. 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 1796, and was pronounced by the British and French as the greatest contribution to the principle of his novel, 'Tremaine' and 'De Vere' are those which have attained the widest circulation. The former was published anonymously in 1825, and the latter in 1827. His other works are—An Inquiry into the Conduct of European Wars, 1803, a pamphlet which first enlisted on his side the patronage and favour of Pitt; Illustrations of Human Life, 1837; Pictures of the World, 1810; Historical Essay on the Revolution of 1688, 2 vols.; S36, 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 1830. 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 gathering and prompt in recording the gossip of the day, Mr. Ward was able to provide an account of the events occurring to Canning, Castlereagh, the much-debated question of the Regency, and the proceedings against Queen Caroline, which are not to be found in any other publication. The latter period, however, is not at present withheld from publica- tion, owing to the warmth of its political and literary facilities in the hands of the Society. The severity of its comments on living statesmen. The 'Diary' will be found in the Memoirs of the Political and Literary Life of Robert Plumer Ward, Esq., published in 1850 by his friend and relative the Hon. Edmund Phillips, 2 vols. 8vo.

Mr. Ward was thrice married: first, in 1796, to a daughter of C. J. Maling, Esq., by the Dowager Countess of Mulgrave; secondly, in 1822, Jane, daughter of the Hon. and Rev. George Hamilton, son of the second Earl of Abercorn, J.P. (an Irish Chief Colonel Plumer, M.F. for Herts in the 17th century), and in consequence assumed the additional name and arms of Plumer; his third wife was a Mrs. Okeover, a daughter of the late General Sir George Okeover, K.B., and late of St. George's, Erk天鹅, 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, 1776, and graduated B.A. in 1800 and M.A. in 1803. At the age of thirteen years, age, carried off the Muirhead prize in the Humanity class. He was distinguished as a diligent and careful student, and gained several other prizes in his university career. He was also nominated to a fellowship at the University, which was then being organised by Messrs. Haldane, Aikman, and Ewing, and from the first he took a respectable, and very soon a leading position among the ministers of that body. A building having been erected by a number of his countrymen, and afterwards converted into a presbyterian church, a church was formed, and Mr. Wardlaw commenced his services on February 16, 1803. This position he maintained with much credit to himself, and usefulness to the independent body, and in the meantime continued to be a large, till his death, a period of more than fifty years. On August 23rd 1803, he married his cousin, Miss Jane Smith, daughter of the Rev. Mr. Smith, of Dunfermline, by whom he had a family of eleven children. In 1811 Mr. Wardlaw was elected Professor of Systematic Theology in the Theological Academy of the Independent body, which was then established in Glasgow. In 1818 he received the Diploma of D.D. from Yale College, Connecticut, and in December 1820 received the degree of D.D. from the University of Edinburgh, in recognition of some chapel in George-west-street, the erection of which had been rendered necessary by the increasing attendance on his ministry. In 1848, Dr. Wardlaw's health being somewhat impaired, the Rev. S. T. Porter was chosen as co-adjutor, and on the death of the former in 1849, which occurred for about two years, when the differences arose in consequence of charges made or supported by Mr. Porter against Dr. Wardlaw, the result of which was the separation of Mr. Porter and a portion of the members from West George-street church, and the formation of a new church under Mr. Porter's pastoral charge. In this case, the deacons and the great body of the congregation adhered to Dr. Wardlaw, and a crowded meeting was held in the City Hall to express sympathy for him, and to present a large sum of money as a token of the approbation of the conduct of the fifteenth year of his ministry was celebrated by special services and a public meeting, in connexion with which a large sum of money was collected, and expended in erecting 'The Wardlaw Jubilee School and Mission House,' at the west end of the city. He died on December 17th, 1853, within a few days of completing his seventy-fourth year.

Dr. Wardlaw took an active part in various public questions, and was a member of the Committee of the House of Commons, which gave rise to some of his most elaborate publications. He was frequently invited to London to preach anniversary sermons, and speak at public meetings of the great religious societies. On several occasions he declined invitations to anoint the sovereign, and to a large extent his work in England. In April 1833, he delivered in London eight lectures in defence of Congregationalism, forming the first series of an annual course called 'The Congregational
Lecturers. In April 1839, at the request of the Protestant Dissenting Deputies, he delivered eight lectures in Freemasons' Hall, London, in answer to the Lectures on Church Establishments, which had been delivered in London the previous year by Dr. Chalmers. As a preacher, Dr. War- law was much esteemed, and his discourses, which were very carefully prepared, were generally well written, and read with a clear andsilver voice, and a calm but impressive eloquence. The following list contains the titles of his principal productions; many single discourses, though delivered to distinguished ministers, and other friends, were likewise published by him. In 1803 he edited a Hymn Book for the Congregationalists in Scotland, containing several hymns of his own composition; in 1807 he published 'Three Lectures on Romanism,' V. 8vo, issued in 1816, 'Essay on Dr. Joseph Lascarac's Improvements in Education;' in 1814, in one volume, 8vo, 'Discourses on the Socinian Controversy,' in answer to Mr. Yates, the Unitarian minister in Glasgow; in 1818, in 8vo, 'Unitarianism incapable of Vindication,' in reply to Mr. Yates's 'Vindication of Unitarianism;' in 1817, 'Essay on Benevolent Associations for the Poor;' in 1831, in 3 vols. 8vo, 'Expository Lectures on the Book of Ecclesiastes;' in 1838, 'A Dissertation on the Christian Baptism:' The 'Divine Dissuasive against the Young against the Enticements of Sinners;' 'Man Responsible for his Beliefs,' in answer to Lord Brougham's inaugural dis- course, in 1835, 'Preparatory Essay to Doddridge's Practical Discourses;' 'Remarks upon Mr. Serjeantson;' in 1830, 'Two Essays: I. On the Assurance of Faith; II. On the Extent of the Atonement and Universal Pardon;' in 1833, 'Discourses on the Sabbath;' 'Civil Establishments an Establishment.' In 1838, he published Baptist Ethics;' or Moral Philosophy on the Principles of Divine Revelation;' in 1835, 'Two Lectures on the Voluntary Church Question;' in 1836, 'Friendly Letters to the Society of Friends;' in 1839, 'National Church Establishment' con- sists with Dr. Chalmers' 'Sketch of the Life and Character of the Rev. Dr. McAll of Manchester,' prefixed to Dr. McAll's Sermons, edited by Dr. Wardlaw; in 1841, 'Letters to the Rev. Hugh Neil of Strath; A. Centre period of his Lectures on the Church of England;' in 1842, 'Lectures on Female Pesti- cution;' in 1845, 'Memoir of the Rev. John Reid, Missionary at the East Indies, and Dr. Wardlaw's son-in- law;' The Life of Joseph and the Last Days of Jacob: a sketch of theSciences' and 'Congregational Lecture on the Sacraments,' in reference to Infant Baptism, &c.; in 1848, 'Congregational Indepen- dency, in contradistinction to Episcopacy and Presbyterianism, the Church Policy of the New Testament;' in 1859, 'The Bible and the Empiric philosophy;' in 1863, 'The Life of Dr. Warneford,' likewise a contributor to various religious periodicals. Of Dr. Wardlaw's sons, one is a missionary in India, another a merchant in Glasgow. (W. L. Alexander, D.D., Memoirs of the Life and Writings of Ralph Wardlaw, D.D.)

WARNEFORD, REV. SAMUEL WILSON, was the son of the Rev. Francis Warneford, vicar of St. Martin's Yard, an old and wealthy North Wiltshire, and he was born in 1770, near Newbury, in Wiltshire, in 1775. At the usual age he was sent to University College, Oxford. Ill-health prevented his attaining any academical honors, but he graduated M.A. 1786, and B.C.L. in 1790. He inherited from his father a considerable fortune; but a few years left him a widower without issue. In 1809 he was presented by his college to the rectory of Lyddington Milicent, Wiltshire, valued at 500l. per annum; and in 1810 he was presented to the rectory of Bourton-on-the-Hill, in Gloucestershire, which he resigned in 1843 after 70 years, and in the same year he took up the degree of D.C.L. He lived at Bourton very pleasantly and sociably, and from an early period devoted a great part of his property to the promoting of large establishments. Among the institutions which arose from his common practice of bestowing trifling eleemosynary sums, refusing, it is said, assistance even to the poorer members of his own family. But there was no ostentation in his manner; while he contributed annually to the funds and almshouses in his own parish. He was contributor to schools, colleges, and hospitals throughout the kingdom. On the Clergy Orphan School, at various times, he bestowed 18,000l.; and he contributed large sums 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 among several donations of 600l. each; but to Queen's College, Birmingham, the total amount of his contributions was upwards of 25,000l. This institution was commenced by Mr. Sande Cox as a school of medicine, and Dr. Warneford liberally afforded pecuniary assistance in founding it to become a college, which was ultimately patronised by the royal family. When it was found desirable to add other departments of education, Dr. Warneford was again the chief contributor; and desirous of giving the religious instruction should be afforded, he founded the college chapel, which is entirely devoted to the permanent religious teaching. In 1844, in recognition of his wide-spread beneficence, the bishop of Gloucester conferred on him an honorary canonry in Gloucester Cathedral; and in 1849 a statue of him was erected in the Warneford Lunatic Asylum at Oxford, the expense being defrayed by public subscription. He died at Bourton on January 11, 1855, enjoying good health till within a few days of his death. He bequeathed 500l. to the Christian Knowledge Society, 50l. to the Oxford University Mission Society for the Propagation of the Gospel, and in addition to various gifts. W.A.R. A.N. PESS (SthHHHb, S. I.)

WARWICK. [MINERALOGY, S. I.]

WASHINGTON. [MINERALOGY, S. I.]

WASHINGTON, a Territory of the United States of North America, lies between 45° 20' and 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 North American States; W. by the Pacific Ocean; and S. by 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 15,924 inhabitants. The country separated from Oregon in 1853, and in 1854 became the first Territory of the United States, in 1859; and in 1861 Washington, then contained less than 2000 inhabitants, exclusive of the native Indians, who probably number about 7000 or more. In its general character Washington is calculated resemblance to Osonon. The surface is generally broken, 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 eastern boundary. The principal streams are the Columbia to the entrance of Gray's Harbour, or, as it was named by Vancouver, Whidbey's Bay, a distance of 45 miles, is rocky and almost unbroken. The entrance to Gray's Harbour is about 24 miles across, but the harbour itself is distant from 12 to 15 miles in length, and 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 Casquet, a lofty promontory at the southern side 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 point of the coast of Washing- ton, 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 perpendicularly sandy cliffs of little altitude, except towards the strait, where it is formed by the entrance of the strait, which is a strait of land sandy point which forms a good anchoring-ground; and beyond this is a deep bay about 3 miles across, and 3 miles from its eastern point is Protection Island, so 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: Vanouver and Puyget unite in describing them as among the finest harbours on the coast of North America. 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, proceeding for about 40 miles, where it terminates in a broad sound named Puyget's Sound. Both these branches afford good anchorage; but Puyget's Sound is broken by several inlets, and affords the
WAS TAT

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 SAPhine or Lewis River. The principal tributary of the southern branch of the Columbia are the Kootanie 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 Chelaksa, which issues from the south branch of the Columbia through the 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 from several small lakes. The Nisqually and Chehalis rivers, fall into Puget's Sound; they are both 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 Clark river.

At present the rearing 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. Beets, potatoes, and flax are also grown in small quantities. The forests yield an unlimited quantity of fine timber. Coal is found in the neighbourhood of Puget's Sound, and near the Chelaksa and Monticello rivers. Iron and other metals have been found; but mining operations have as yet been but little heeded. A district of valuable gold lodes has been discovered near what is now called Gold Bar. The Columbia will probably 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 these waters and the schools of salmon abound. The Columbia River abounds with trout and whitefish, and shell-fish are very abundant. The commerce of Washington is yet in its infancy, but it is steadily increasing. Nearly all the commerce centres in the district of Puget's Sound.

Washington has as yet no town of many inhabitants. The principal city is Olympia, on the right bank of the Tenalquait or Shute River, at its entrance into Puget's Sound. This town boasts of its hotel, stores, saw- and grist-mills—the first in the Territory—newspaper, &c.; and contains 200 inhabitants. The capitol is on the bank of the Columbia River, on the right bank of the Columbia City, on the right bank of the Columbia, 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; Nisqually, on the east side of Puget's Sound, the property chiefly of the Puget's Sound Agricultural Company, whose farms supply provisions to the servants of the Hudson's Bay Company west of the Rocky Mountains; and Pacific City, on the right bank of the Columbia, about 40 miles above the mouth of the Columbia, on the ocean side of the Columbia, which appears likely to become a place of some trade.

Washington was separated from Oregon, and received a territorial constitution, by Act of Congress, March 2, 1853. By this Act the right of voting is vested in every free white male twenty-one years of age, and the electoral vote is given by the legislature. All laws passed by the legislature must be submitted for confirmation to Congress. No law can pass interfering with the primary disposal of the soil; or taxing the property of non-residents higher than one-half the rate on real estate. The political capital, Olympia, is located at the mouth of the Nisqually River. The Columbia River is the principal source of the Columbia River system. The Columbia River is the Columbia, which belongs equally to Washington and Oregon; it is described under Columbia River.
philosophy and chemistry, and he had also applied himself to the practical study of mineralogy. It is scarcely known, and has not been recorded in any previous biographical work, that he was for a short time, when in his twentieth year only, one of the secretaries of the Literary and Philosophical Society of Manchester, then just founded, one of the earliest, and perhaps the most distinguished of the provincial civil-service. To the Memoirs of this society he contributed two papers, in 1786, and in the years 1788 and 1789 (Inglespark, near Chorley, in Lancashire) -in which the aerated carbonates of barytes are found, and the other on the effects produced by different combinations of the Terra Fonderosa, he was one of the first to establish the principle of adaptation. From the time of his departure from the army, the aid, the actual discoverer of the carbonate of barytes at Anglicark, he was the first to describe, in the paper here alluded to the circumstances under which it occurred, and to make known the fact that the specimens examined and the supplies of the mineral from which it was prepared were, the urate, which had been recently introduced into medical use by Mr. Adair Crawford, F.R.S., had been obtained from that locality. His also were some of the earliest experiences 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 mineralogy, which he began with a series of excursions and observations. Amongst those that appear, by his friend Thomas Cooper, one of the vice-presidents of the Manchester Society, and who afterwards became professor of chemistry in Columbia College, in America— he proceeded to Paris. But here, carried away by the movement of liberty, he sympathised with the Girondists and Jacobins, and even took some open and avowed part in their earlier tumultuous agitation, in company with Cooper, and subsequent to what the poet also. Southey has recorded, from the information of James Watt himself, that so high 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 of liberty was the following. When the Girondists were besieged and surrounded by Berns in the House of Commons. The licence and excursions 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 surrendered 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, the committee of public safety, which investigated the memorials of Pitt, the British prime minister, James Watt 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 French nation. Returning home he learned that his life 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 1811 taken the enterprise 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 much resembled), had proved so successful, had built several steam-vessels propelled by engines of his own construction. Among these was the Caledonia, of 108 tons and 52-horse power, which was launched in 1815, but from defective engines has been little used. The ship was, however, she was purchased by Mr. James Watt, who had her machinery taken out and replaced by two new engines of Soho manufacture, of 14-horse power each. In October he went over in her to Holland, and ascended the Rhine as far as Coblenz; having thus been the first to leave the British

abores and cross the Channel by so novel and, as it was then esteemed, so hazardous a mode of transit. On her homeward voyage she entered the Scheldt and visited Antwerp, and was then laid up for part of the winter in the harbour of 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 was the first to bring to a practical issue experiments with vessels that made the water with the river (the whole number of those experiments amounting to 200), which resulted in the adoption of many most material improvements in the construction of marine engines, and in the third edition of that 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 53,314 real horse-power.

Some further particulars of Mr. James Watt may be gleaned from the two later publications of Mr. Muirhead. He wrote, in 1852, the Memoir of his father in Macvay Napier's Supplement to the 'Encyclopaedia Britannica' (subsequently transferred, in substance, to the third 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 manuscripts 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 brach-nbine to Tunbridge Wells, exposing the Wealden Beds and the Upper Chalk Beds sands.

The fossils of this group are as follows:

**Planta.**
Corallites Mantelli, Loc.
Chlorispartein Mantelli, Bron.
Cottus mantelli, Mant.
Bromeliad Martelli, Mant.
Sphenophyllum Martelli, Mant.
Sphagnum Martelli, Mant.
Serrata Mantelli, Mant.
S. Sphagnum Mantelli, Mant.

**Insecta.**
Corallus elongatus, Brod.
Corallus latistriatus, Brod.
Aderia sediplicata, Brod.
Diptaa Stricklandii, Brod.
Coccus maculatus, Brod.
Rutina fulva, Brod.
Coccus pongum, Brod.
Coccus castaneus, Brod.
Cytoneura punctata, Brod.

**Crustacea.**
Cypria, 5 species.
Clypeus Dismayria, Brod.

**Cockles, Lat.**
Buccinum Tellinoides, Sow.
Unia, 10 species.

**Mammalia.**
Phrygarcha bulla, Sow.

**Gasteropoda.**
Acmae Podii, Sow.
Bulla Mantelli, Sow.
Melanosia, 2 species.

**Placida.**
Acrodes Hirudo, Ag.
Hybodius, 6 species.

**Gnathan.**
Tetragonolophus mantelli, Ag.
Ophiopeus penicillatus, Ag.
Gyrodus, 2 species.
Lepidostoma, 3 species.
Ficnodus Mantelli, Ag.
Pholidophorus ornatus, Ag.

**Reptilia.**
Caterus, 2 species.
Chelidonia, 2 species.
Chelidochus cruciatus, Owen.

**Pulsatilla assurma, Mant.**
Platysma Mantelli, Owen.
Potokileurum Bucklandii, Owen.

**Oxynota assurma, Mant.**
Suchesia cruciata, Owen.

**Megacorynus Bucklandi, Mant.**
Tristis lepidoc, punctatum, Mant.

(Tenant, Stratiographic List of British Fossil.)

WEAVER, THOMAS, F.R.S., an eminent geologist, was one of the band of learned 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 1829. 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 1839. From 1836 to 1878, and again in 1861, he was concerned, with the gentlemen mentioned below, in the exploration, on account of the geological, of the deposits of gold which had been discovered at Croucham Kinhella, 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 Abraham Mills, Esq., both referring to Mr. War, were published in the *Philosophical Transactions* for 1839. A particular history of the proceedings of himself and his colleagues, in reference to the gold workings, was given by Mr. Weaver in the *Transactions of the Geological Society,* first series, vol. v. He afterwards com-
no means lucrative. In 1808 he married his first wife, by whom he had two sons and two daughters, of whom only one son, Fletcher Webster, survived him. He was a naval officer of the port of Boston. In May 1813 Daniel Webster took up an appointment as a Representative of the Federal Assembly of New Hampshire. Placed by Mr. Clay, the speaker, on the committee of foreign affairs, he made his first speech in the house of representatives, June 10, 1813, in moving a series of resolutions on the Berlin and Milan decrees. In August 1814 his house, furniture, library, and manuscript collections, were all destroyed. In August 1816 he was again returned as a representative to congress. From March to December 1815 he was busily engaged in the practice of the law at Plymouth, where he was destined to remain, but on the 28th of December, he was removed to Boston, where the causes for trial were of higher importance and the practice was more lucrative.

Mr. Webster retired from congress in 1817. He had purchased an estate of about 2000 acres at Marshfield, about thirty miles from Boston, and his time during the next six years was partly occupied with law business at Boston and partly with the cultivation of his estate. His favourite amusements were angling in the streams and fishing in his yard. He retired to private life, again elected senator in 1827, as he was also in 1824 and 1826. In 1827 his first wife died. In January 1828 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 presidential nomination in 1828, but defeated on the twelfth votes of Massachusetts.

In the spring of 1839 he visited Europe for the first and only time in his life, and made a hasty tour through England, Scotland and France. When General Harrison became president of the American army, he was appointed a senator from Massachusetts.

In 1832 he negociated with Lord Ashburton the Oregon boundary, and the treaty which settled that question between Great Britain and the United States was ratified August 20, 1842. In May 1843 he resigned his situation as minister, and retired to private life. In July 1844 he was opposed to the war with Mexico in 1846, as he had previously opposed the annexation of Texas. In 1848 he was again a candidate for the presidency, but was un-successful. In the 5th of General Taylor in July 1849, he was opposed to the war with Mexico in 1846, as he had previously opposed the annexation of Texas. In 1848 he was again a candidate for the presidency, but was unsuccessful. His speech upon the nomination of Mr. Van Buren was criticized by the New York Sun. In 1848 he was again a candidate for the presidency, but was un-successful. His speech upon the nomination of Mr. Van Buren was criticized by the New York Sun.

In the autumn of 1850 the 33rd regiment, embarked for the West Indies; but the ship, after lying towed at sea for six weeks, was obliged to put back to the great south, and the 33rd regiment was landed again, in April 1850 was sent to India. Colonel Wellesley (for he had been promoted to the rank of Colonel in May of that year) was shortly afterwards attached at Mysore, and then at the Cape of Good Hope, and proceeded with it to Calcutta, where he arrived in February 1870, and was placed on the Bengal establishment.

In May 1862, Colonel of Mornington, Colonel Wellesley's elder brother, arrived at Calcutta, having been appointed governor-general of India on the 4th of October 1871. One of the first objects that required his attention was the equinoctial attitude of Tippoo Sahib, sultan of Mysore, towards the English. In the month of June a proclamation of the French governor of the East Indies announced the arrival of two ambassadors from Tippoo, to propose an alliance offensive and defensive for the purpose of expelling the English from Mysore. Colonel Wellesley, as a Governor-General of India, was considered as having been formally received by the sultan, and was taken to Mysore in a French ship of war. These movements of Tippoo were connected with the French expedition to Egypt. The Earl of Mornington wrote several conciliatory letters to Tippoo, to induce him to settle any peaceable differences between him and the East India Company by means of negotiation, but at the same time he did not neglect to prepare for offensive operations, and in November an army was assembled at Vellore, under General Harris, ready to enter the territory of Mysore. At this time Colonel Wellesley, with his regiment, formed part of this force. The army was joined by a large contingent from the Nizam of the Deccan, an ally of the English; and as the court of Mysore was opposed to the French, and Tippoo was not to be governed by the French, the Governor-General was appointed to the command of the contingent, General Harris ordered the 33rd regiment to be attached to the Nizam's force, the general command of which was given to Colonel Wellesley. As Tippoo declined to
enter into negotiations, and was evidently trying to gain time, the allied British and native army was ordered to advance to Mysoor, which they entered early in March 1799. On the 27th an engagement took place, in which the led in the battle of Seringapatam. Colonel Wellesley, rear body of Tipur's choice infantry. The army then advanced to Seringapatam, Tipur's capital, and Colonel Wellesley was employed to dislodge the enemy from some strong posts in front of the town, which he executed in gallant style, and without loss. The siege of Seringapatam continued, and on the 4th of May the place was stormed by a party under General Baird. After the storming was over, and the confusion begun to subside, General Baird desired to be relieved, and it was ordered that the gharrys should be removed from the gates of the place. By his exertions and firmness he succeeded in stopping the plunder within the town. Tipur Saib was slain.

In July 1799 Colonel Wellesley was appointed governor of Seringapatam, then the capital of Mysoor. During several years he held almost vice-regal command in Mysoor he was fully occupied in organising 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 displayed the quickness of perception and the decision of character which have characterised him throughout the whole course of his military career. From the beginning he also paid particular attention to the wants of his own soldiers, and to the management of the hospitals, and to all the particulars of the Commission and Quartermaster-General's departments, which constitute half the business of an army, and, to use his own words, if neglected, "misfortune and disgrace will be the result." Colonel Wellesley, after a harassing service in the campaigns of 1801, 1802, 1803, and the first six months of 1804, he was ordered to the East India Company's factory at Trincomalee, in the island of Ceylon, for foreign service, and he early in the year proceeded to Mysore to Trincomalee. The expedition sailed from Mysore on 1st July, 1801, and arrived at the Isle of France. Meantime despatches from England arrived, directing 3000 men to be sent to the Red Sea to act against the French in Upper Egypt, whilst an expedition from England, under Sir Ralph Abercrombie, was attacking Lower Egypt. The despatch from Lord Maida, announcing the despatch of copies of the despatches from home, and as he knew that his brother, the governor-general, when he ordered the assembling of the forces at Trincomalee, had some expectation of its being required for Egypt, Colonel Wellesley, upon his own responsibility, moved at once the whole force to Bombay, where it could be supplied with provisions and other necessaries previous to sailing to the Red Sea, and where he would be ready to receive final orders from the governor-general. He arrived at Bombay about the middle of February, 1801, and arrived at Bombay about the middle of March. The governor-general had appointed General Baird to command the Egyptian expedition, leaving to the brother the choice of going under him as second in command, or retaining his own command in Mysore. When Lord Mordaunt learnt that Colonel Wellesley was at Bombay 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 sent by Trincomalee, but he thought it ought not to be set up as a precedent, and he required an official explanation of the grounds and motives which had induced his brother thus to act upon his own judgment, rather than on orders. Colonel Wellesley stated his motives at full length, and General Baird, on March 23, 1801. ('Dispatches,' vol. 1.) He intended to proceed to the Red Sea, and to have served under General Baird; but on the 30th 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 containing the operations in the Red Sea, availing the research and collection which he had bestowed on his anticipated command. Colonel Wellesley made a second entry in his Mysoor, near two years. He was raised to the rank of Major-General in April 1808, and in February 1808 he was appointed to command a force intended to march into the Maharratt territories.

Civil war raged between the Maharratt chiefs Holkar and Scindia. The Peishwa, the nominal head of the Maharratt confederation, was looked upon as an instrument in the hands of the strongest. Dowlut Rao Scindia, who ruled Malwa, the land between the Nerbudda and Tapti, and the Maharratt maharajahs, who were engaged in a war of extermination with the Nawanagar petty principality, had a close correspondence. Holkar was engaged in the war, and Scindia was engaged in the war with the Nawanagar. 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 defeated the combined army of Scindia and the Peishwa. The Peishwa, taking the capital, and putting himself under British protection, whilst Holkar placed one of his relations on the seat of power at Poona.

The Madras army, under Colonel-General Stuart, was on the top of the mountain of the Mahratta territory for a purpose of re-occupying the Peishwa, 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 had been defeated, he sent a detachment to Poona, with the cavalry, and, performing a march 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 the following month the Peishwa, having received the news of 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 was called 'The European Army,' and was composed of Europeans and natives, including the 19th Drogo-os, and the 74th Foot. After some fruitless negotiations with Scindia, General Wellesley marched from Poona to the north, and took by escalade the town of Ahmednagar, which was carried easily, and was followed by a pursuit, which advanced to the river Godavery, and entered Aurungabad on the 20th. The enemy manifested an intention to cross the river to the eastward and seal a march upon Hyderabad, but were prevented by General Wellesley marching along the left bank 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 Godavery. Colonel Stevenson, with the Nizam's auxiliary force, was at some distance, and not willing to march at once with a regular cavalry, avoided a general engagement, being afraid of 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 Kainia. On the 21st of September the French and Scindian forces were engaged, and Colonel Stevenson, in whom the general was greatly interested, advanced Bod posture, 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 intention, and directing his advance. He had congratulated the British Light infantry, and the third regiment 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 Mahatta force, consisting of nearly 80,000 men, encamped on the north side of the river Kistna; the right, consisting of cavalry, was about Bokerdou, and extended to their corps of infantry, which was encamped near the village of Assaye, with 80 pieces of artillery. General Wellesley determined on attacking the intrenched camp, and for that purpose he undertook the march, a ford beyond the enemy's left, and, leaving the Mysore and other irregular cavalry to watch that of the enemy, he crossed the river with his regular horse and infantry, and having secured the bridge which was formed by three lines, two of infantry, and the third of cavalry.

This was effected under a brisk cannonade from the enemy's guns. Scindia at the same time made a corresponding movement in his line, by giving a new front to his infantry, which was made to retire to the river Kistna, and its left upon the village of Assaye and the Juba stream. His numerous and well-served cannon did fearful execution among the British advancing lines. General Wellesley, seeing this, gave orders to abandon the artillery, and for the loss of the intrenched camp. The castanets were dropped, and the regiment, irresolute on the right and centre of the enemy; the British took possession of the guns, and the enemy's infantry gave way. But the British right suffered a very severe loss from the guns at the village of Assaye, and the enemy's cavalry, seeing the castanets in the enemy's hands, undertook the regiment, when Colonel Maxwell, with the 19th Dragoons, rode to its rescue, and drove back the assailants with great loss. The native infantry in the British service proceeding too far in the pursuit, many of the enemy's settlement, and his horse and infantry, as if they were dead, turned their pieces against the advancing infantry; and at the same time several of Scindia's battalions formed themselves again, thus placing the sepoy between his horse and infantry, and making it difficult for him to effect the same. In the course of the same year he left Calcutta for Madras, whence he was ordered to the Cape of Good Hope.

In February 1803 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 made known 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 public orders in India. On the 10th of March 1803 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 Castlereagh, which was intended to make a diversion whilst the French army was engaged in the 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 appointed Governor of the British Settlements. On the 10th of April 1806, he married Lady Catherine 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 Castlereagh's policy, and supported him in his measures. In the same year he was appointed to a command in the expedition to Copenhagen, under Lord Castlereagh and Admiral Gambier. On the 23rd of August General Wellesley's division attacked the Danish troops at Kjøge, carried their entrenchments, and captured the enemy's magazine, with nearly 1200 prisoners. This was the only action 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 Cathcart, 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 Danish government on the 7th of September, and by which the Danish fleet and naval stores were delivered to the British fleet. Sir W. 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 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 Cadiz in accordance with the general plan approved by Sir W. Wellesley, to inflict a severe blow to the Spanish colonies of South America, Spain being, 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 Asturias, Oviedo, and Guipuscoa, in the territories of 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 coast and gallant Sir Arthur Wellesley was again sent to Spain. He 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 proviso that the Spanish should furnish a force of 10,000 men in short time. He formed altogether a respectable military force, but the importance of the occasion warranted exertions even greater than these, for the Spanish peninsula had now become the field on which the great question was to be decided whether France was to govern Europe, and dictate to 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 desired the assistance of a British auxiliary force, but they advised General Wellesley to land in Portugal, to rescue that kingdom from the French grasp, and thus 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 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 about 10,000 men, but unarmed and equipped. He also learned that 5000 Portuguese regular troops were stationed at Coimbra, on the Mondego. Having made arrangements with the bishop for the supply of mules and horses, General Wellesley sailed to the south as far as the mouth of the Mondego, but not venturing to land in that position of the French troops 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 Figueira, on the south bank of the Mondego. The number of troops landed was about 9000. On the 5th Major-General Spencer joined him from Cadiz with about 4000 more.

The French force in Portugal at the time, under Junot, consisted of over 20,000 men, from which deducting 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 Bessières had not advanced westward further than Beavente, being observed by the Spanish army of Galicia. Although the French had 600 French and 3000 Portuguese regular troops, they were doomed to retire 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.

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 Portuguese crown. Sir Arthur 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 1800 of his men to join Sir Arthur. They joined the French near 30th 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. But before relating the operations, it may be convenient to describe the position of the French in Portugal.

When the Spaniards 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 the news from Spain, revolted against the French commandant, seized the town with the 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 in a short time, with the help of the Highlands, the whole of the provinces north of the Douro 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 French troops which had been sent to the south. This was the beginning of 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 resistance on the part of the inhabitants, and the town was given up to indiscriminate massacre. General Margarão executed like vengeance at Leiria, sparing neither age nor sex. Similar successes took place at Guarda in the north, and at Beja and VilaViçosa in the south. In these battles, however, the French were 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 king's army, observed Sir Arthur Wellesley, was one of his first lines of defence, and the officers have gone off to Brazil, and their arsenaux are pillaged or in the power of the enemy. Their revolt, under the circumstances in which it has taken place, is still more extraordinary than that of the Spanish nation. They have thrown off their duty, and have armed about 10,000 men, 9000 of arms, of which number 5000 are to march with me towards Lisbon, the remainder are employed in a distant blockade of Almeida, and in the protection of Oporto, which is now the seat of the government. The insurrection is general throughout Alemtejo and Algarve to the southward, and in Évora Douro e Minho, Trás-os-Montes, and Beira, to the northward; but for want of arms the people can do nothing against the enemy.

The commanding-in-chief, Junot, on the news of the landing of the English, determined to abandon the provinces, except the fortresses of Elvas and Almeida, and to collect his force in the neighbourhood of Lisbon. He sent a division of about 3000 men under De Laborde towards Leiria, to keep the English in check; and he ordered Loison, who had returned from his expedition into Alemtejo, and had crossed the Tagus at Abrantes, to join De Laborde at Leiria. But the rapid advance of the English troops overpowered them, and they were driven back by the French general into the town of Leiria, and now De Laborde determined to make a stand alone in the favourable position of Rolica, hoping every moment to see Loison appear on his right.

General Wellesley having having observed the French enemy's picquets from Obidos, marched on the 17th of August to attack De Laborde. He formed his army into three columns: the right consisting of Portuguese was ordered to make a demonstration on the enemy's left; the left to ascend the hills on the
mander-in-chief, landed in Maceia Bay, and assumed the command. In the course of the day General Kellerman appeared with the port of Junot to propose an armistice, preparatory to entering into a convention for the evacuation of Portugal by the French. The terms were discussed between General Kellerman and Sir Hew Dalrymple, who in the end directed General Wellesley to sign the armistice. Among the articles there was one which 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 "their private property," or what nothing should be detained! This, of course, would include the church plate and other public and private property which the French had taken either at Lisbon or in various towns, which they had divided among themselves. 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 same evening. The armistice however was made subject to the approbation of the Adjudir, Sir Charles Cotten; and as one article of it stipulated that the Russian fleet in the Tagus, under Admiral Suvaniv, should enjoy all the advantages of a neutral port, Sir Charles objected to this, and the article was accordingly altered. The British, however, are 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 was already in effect with the French. In the mean time the army had made a forward movement from Vimiero to Remalhal, near Torres Vedras, within the boundaries stipulated by the armistice. Sir John Moore had also arrived in Maceia Bay, and his troops were about landing. In consequence of this 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 the situation of the army, and his own intended plan of operations, which did not by any means accord with the plan of De Laborde and Loison. Sir John Moore had taken at Torres Vedras. By this measure he would oblige the French either to give battle or retreat to Lisbon under great disadvantages. Sir Harry Burrard however decided not to advance any farther till the arrival of the reinforcements under Sir John Moore. But the enemy in the meantime was bringing the question to a speedy issue.

Junot, 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 of Vimiero early in the morning of the 21st of August. The principal attack was made upon the British centre and left, and was directed by De Laborde and Loison; who, for over six hours, of driving the English into the sea, which was close 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 with the bayonets, withdrew upon all points in confusion, leaving many prisoners, among them a general officer, and 14 cannon, with ammunition, etc., in the hands of the British. The loss of the French in killed and wounded was estimated at about 1800, and that of the British 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 the conduct of the Royal Legion, as he had decided 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 gaining ground, and General Lake's division of the advance guard had made strong resistance. Torres Vedras they would have reached it before the French, who would have cut off from Lisbon, and perhaps obliged to fly down their arms. Such was Sir Arthur's view; but Sir Hew Dalrymple proposed to move any farther, especially on account of the superiority of the enemy's cavalry. General Ferguson was ordered to desist from pursuit, and the French officers were thus enabled to rally their men, and make good their retreat to Torres Vedras.

On the 24th of August Sir Hew Dalrymple, the com-
Sir Arthur Wellesley's employment in the Peninsula being now terminated, he resumed the duties of his office as Chief Secretary for Ireland, which he proceeded to discharge 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 services in Portugal, and in particular for his attempt to get the House of Lords passed resolutions to the same effect, which were communicated to Sir Arthur by the Lord Chancellor.

The year 1809—Napoleon, with an army of more than 300,000 men, marching through the Spanish lines and routed the troops, forced in person the strong pass of the Somosierra on the 30th of November, and four days afterwards was in possession of Madrid. Meantime, Sir John Moore, with a small force, had been sent against Sir John Moore, who had advanced into Salamanca 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 defeated and abandoned by his British force in the retreat to England. The French, following up their success, spread over Leon and Estremadura to the borders of Portugal, and Soult, having over-run Galicia, marched into the northern Portuguese provinces, and carried Oporto by storm against the small British force, which had been left in Portugal when Sir John Moore advanced into Spain. Wellington was then sent by Sir John Cradock for the defence of Lisbon. The unfavourable turn of affairs in Spain induced the Portuguese government to make another effort to save Portugal from invasion, the same to send an army 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, and was appointed chief confidant to the British troops in the Peninsula. He arrived at Lisbon April 22, 1809, with his staff. He was followed by reinforcements of infantry and several regiments of cavalry. These, together with the Portuguese regularly under General Beresford, whom 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, guarding the eastern frontiers of Portugal against the French. General Victor, who 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 the English occupied the southern bank of that river opposite the city of Oporto. The French had destroyed the bridges and removed them to their own side, and Soult was preparing to retire leisurely by the coast to Galicia. General Wellesley sent a brigade under General Murray to pass the river about four miles above Oporto, whilst the brèche of Guards was directed to cross the river at the suburbs of Oporto. Soult's right flank was attacked, and the commander-in-chief was to attempt a passage in the centre by means of any 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 16th of May, two boats having been discovered, General Faget with three companies of the Boifs crossed the river, and got possession of an unfinished building on the Oporto side, called the Seminaria. The town of Oporto was then approached, and Wellesley succeeded in attacking the Belgians, but, before they could dislodge the first party that landed, General Hill crossed with fresh troops, and, pressed by the British artillery from the southern bank, maintained the contested ground gallantly, until General Sherbrooks 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 Aveiro, under General Grant, was about to make a 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 the Minho; but finding that Loime had about taken the bridge of Amarante, which was taken possession of by the Portuguese, he marched by Guimaraes, Braga, Sal-mouzdo, and Montalegre, into Galicia. In this disastrous retreat the French were obliged to leave in the remainder of the artillery and part of their baggage, and the road was covered with dead horses and men, and French soldiers, many of whom were put to death by the patriots before the advanced guard of the British could save them.

In a general visit of Oporto only 23 killed and 62 wounded. On asking of Sir John Moore Wellington issued a proclamation, strictly enjoining 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 use the Spanish hospitals.

The attention of 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 considerably. The country had been invaded, and the inhabitants had been led by Napoleon's generals individually and collectively in such a manner that it was impossible to do anything without a sufficient force, and the British were more and more animated. Sir Arthur Wellesley was sent to the Peninsula, acted by himself, and the warfare became complex and irregular. Marshal Victor, Duke of Belleisle, commanded the first corps in Estremadura, near the borders of Portugal, having about 36,000 men, of whom however not 18,000 were under arms. General Sebastiani commanded the fourth corps in La Mancha, which mustered about 20,000 men under arms. A division of reserve under Desilles stationed at Madrid, together with King Joseph's guards, amounted to about 16,000 men. Kellermann's division stationed in Old Castile and on the borders 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 to act offensively in Andalucia and against Portugal by the Tagus and the Guadiana. Soult had a distinct command. He had mainly to occupy the northern provinces of Spain and to act through them against Portugal. He had about 12,000 men, consisting of 9,000 French troops and the second corps of the French army, which had about 9,000 men under arms; the fifth, or Mortier's corps, amounting to 16,000; and Ney, with the sixth corps as about 18,000. Soult's force in all was about 33,000 men, and the French soldiers in all were in a splendid state of health, the English advancing from Portugal were likely to be brought into collision. Besides these there were in Eastern Spain the third and seventh corps, making together about 600. men, under Buchet and Anguistrois, who were already employed in Aragon and Cataltias; and 80,000 men were
scattered in the various garrisons and lines of communication.

The fortresses and fortified towns in the hands of the French were: 1st, on the northern line, San Sebastian, Pamplona, Bilbao, Santona, Santander, Burgos, Leon, and Astorga; 2nd, on the central line, Loga, Zaragoza, Guadalupe, Toledo, Segovia, and Zamora; 3rd, Figueras, Roses, and Empuries on the Baltic coast. These places were not driven out of northern Portugal, had withdrawn from Galicia; and, following the same movement, completely evacuated that extensive province, including the forts of Vigo and Bilbao, and leaving more than 20,000 men behind. Between those two commanders led to the deliverance of Galicia; which was an important event in the war, for the French never regained that part of Spain.

Marshal Soult reached Zamora in the beginning of July, and invaded the eastern frontier of Portugal, where he arrived at Astorga. Victor was posted between the Tagus and the Guadiana, and his troops suffering much from malaria. Mortier, with the 35th corps, on the road from Zaragoza to the French, received orders from France to halt; and the Imperial Guards, which Napoleon had ordered to Spain, and which had arrived at Vittoria, were hurriedly ordered to march to the banks of the Danube. This was in consequence of the Austrian war, which had just broken out.

On July 15th, Soult was able to send 30,000 men to Portugal, and 10,000 more to the north-west frontier of Portugal, where he arrived at Astorga. Victor was posted between the Tagus and the Guadiana. This was the force with which General Wellesley had to co-operate in an advance from Portugal into Spain for the purpose of attacking Victor and attempting to reach Madrid. The French commander had been so far in advance in the Peninsula that he had not yet seen a Spanish army in the field, and he could have precisely noticed his defection and discipline. He however soon obtained that knowledge when he came in contact with Cuesta. But there was another reason for the French retreat, deriving from their want of obtaining provisions and means of transport for his army in Spain. His letters during the whole of this campaign were filled with painful details on this subject. The people, the local authorities, the generals, and the Junta, all seemed to be completely at a loss for obtaining provisions and means of transport for his army in Spain. His letters during the whole of this campaign were filled with painful details on this subject. The people, the local authorities, the generals, and the Junta, all seemed to be completely at a loss for obtaining provisions and means of transport for his army in Spain.

While Cuesta's army was engaged in the capital, the French, to whom the army of Portugal was added, could not take what they liked, and will take it, but they cannot even pay common necessities.

The British army entered Spain in the beginning of July by the road of Zarza in Majorca, and Coria, and the head-quarters were at Seville. The French army crossed the Tagus by the bridge of Almaraz, and the two armies made their junction on Oropesa on the 20th. Sir Robert Wilson, with the Lucastian Legion, one Portuguese and two Spanish battalions, moved on to Seville, about eight leagues from Madrid, threatening the rear of Victor's army, which was posted at Talavera de la Reina. On the 23rd the combined Spanish and British armies attacked Victor's outposts at Talavera, and drove them in. The enemy would have suffered more if Cuesta had not been absent from the field. The British columns were formed for the attack of the French position on the 23rd, as General Wellesley wished to attack Victor before he was joined by Sebasiani, but General Cuesta "contrived to lose the whole of the day, to the immense advantage of his disposition." (Dispatch to J. H. Frede, 24th of July, vol. iv., p. 592.) On the morning of the 24th Victor retired across the Alberche into St. Ollala on the Madrid road, and thence to Torrijos, where he was joined by General Joseph in person, attended by Marshal Jourdan with the Guards and the garrison of Madrid. General Cuesta, who now seemed eager for battle, although General Wellesley recommended him to be very cautious in his movement, which could then have been a corps cut off and driven into the Tagus, and killed him fallen back upon the British, on the Alberche. On the 27th General Wellesley, expecting to be attacked, took up his ground in the position of Talavera. The position of the English army was then becoming more critical, for Soult was rapidly advancing from Salamanca, by the Puerta de Bagos, upon Plencia, in the rear of the British. General Wellesley had charged Cuesta to guard the mountain-pass of Bagos, and had sent 500 men thither, a force which of course proved insufficient to arrest Soult's march. General Wellesley did not know that Ney had unexpectedly evacuated Galicia, and was also advancing from Astorga upon the British left. Mortier also, with the 35th corps, which was on the road to Portugal, moved forward, so that there were more than 80,000 fighting men of the enemy behind the mountains of Plencia, ready to act on the left flank and rear of the British, who had besides the 20,000 men left in his front, who did not exceed 80,000. There were a few more battalions 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 25,000 men, such as they were. The Portuguese regular troops, in order 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 Andalusia, consisting of about 20,000 men, should march through La Mancha upon Madrid, whilst Wellesley and Cuesta were advancing by the valley of the Tagus. Venegas did advance through La Mancha, but it seems that the Junta did not authorize the movement of the Junta which had the effect of slackening his march; he however made his appearance at last towards Aranjuez and Toledo, and it was his approach on the 13th which induced King Joseph to engage Venegas and Cuesta, in order to save his capital. It was then evident that Madrid could not hold longer, Soult's arrival at Plencia would have obliged the English to retire precipitately. But King Joseph fearing that Venegas from the south, and Sir Robert Wilson, who, with the Lucastian Legion, was holding the town of the neighbourhood, would assuredly Madrid and seize the city and all the road to the reserves, &c., he and Marshal Victor determined to give battle to the Allies in front: for if they were defeated, Madrid could be easily protected. General Wellesley, perceiving the situation of the enemy, hesitated no longer, and his troops were well protected by 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. Ollala, crossed the river Alberche, drove in the British outposts, and attacked the 4th corps, which had retired from the mountains 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 fire, 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 of Alberche, and the hill, being ordered to that point with more troops, drove the French down after an obstinate struggle which lasted after dark, and in which the French lost about 1000 men, and the same night, the French renewed the attack on the hill on the British left, and were 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 the British corps of the 4th of July, 1812, and 1813, Campbell, which joined the Spanish army, but were each time repulsed by the steady fire of the English; a Spanish cavalry regiment charging on their flank at the same time, they retired in disorder, after losing a number of men and 10 guns. In the mean time a French division, supported by two regiments of cavalry, again advanced to turn the British
battle having been fought a few days before. On the 2nd of August Sir Arthur Wellesley learnt that the enemy had been driven out of the town of Vitoria, and that a new division of Bussac's corps, which he estimated at only 15,000 men, and that his intention was to join Victor, he determined to encircle him before he could effect the junction: he therefore marched on the 3rd of August to Oropesa with the British army, leaving Sir John Moore, with the Portuguese, to pursue the French upon the road to Madrid. He had to encounter the obstacles of the Tagus, from the neighbourhood of Madrid to the frontiers of Portugal. King Joseph and Sebastian were at Illescas and Valdemoro, between Madrid and the Tagus, while the advanced posts of the French were at Becima and Santa Cruz. Vitoria 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. Soulé was on the Tietar, on the road from Plasencia to Almaza. Berrondo, with 3,000 augues, was said to be moving farther west along the frontiers of Portugal. "The allies under Wellesley and Cuesta had the centre, being only one day's march adunder; but their force, when concentrated, was not more than 97,000 men. The French could not now break the combined forces excelled 90,000 men, of whom 53,000 were under Soulé; and this singular situation was made more remarkable by the ignorance in which all parties were as to the strength and position of their enemies. On the 4th, the French forced a bridge, and the 5th, they fought a desperate day against the action of the Portuguese corps of 4,000 men, were preparing to unite at Moscle, near Madrid; while Cuesta, equally alarmed at Victor, was retiring from Talavera. Sir Arthur Wellesley was supposed by King Joseph to be at the head of 25,000 men; and Sir John Moore, culminating in Soulé's weakness, was marred with 23,000 English and Spanish to engage 63,000 French; while Soulé, unable to ascertain the exact situation of either friends or enemies, and the first battle of its kind on the southern coast of Europe, this moment the fate of the Peninsula hung by a thread, which could not bear the weight of twenty-four hours; yet fortune so ordained that no irreparable disaster ensued." (Napier's History of the Peninsular War, i. x.)

In the evening of the 3rd of August, Sir Arthur Wellesley learned that Soulé's advanced posts were at Naval Moral, and consequently between him and the bridge of Almarza, on the Tagus, thus cutting his line of communication with Portugal. At the same time letters from Cuesta to general officer were forwarded from Vitoria, and that Soulé must be stronger than was supposed; and that therefore he, Cuesta, would quit Talavera that evening, and join the British at Oropesa. Sir Arthur immediately moved towards Cuesta, who had written urging Cuesta to return to Talavera, in order to cover the evacuation of the British hospitals from Talavera. But Cuesta was already on his march, and early on the morning of the 4th appeared near Oropesa. Sir Arthur by this time had learned from intercepted letters that Soulé's force was much stronger than he had supposed, though he could not gainsay its full strength. Cuesta's retreat would immediately bring the King and Victor upon him. He was placed between the mountains and the Tagus, with a French army advancing upon him on each flank; the retreat by Almarza was cut off; he had seen enough of Cuesta and the Spanish army not to rely upon them on a field of battle; and he could not, with 17,000 British, fatigued and in want of provisions, fight successfully two French armies, each much stronger than his own. His only remaining hope was the bridge of Arzobispo, below Talavera. By taking up a line of defence beyond that river he might keep open the road by Trujillo to Badajoz. This however must be done immediately, before the enemy could get the upper hand by the force of circumstance. He communicated his determination to Cuesta, who, according to his custom, opposed it: he wanted now to fight the French at Oropesa; but the English general told him sternly that he might do as he liked with his 10,000 and 4,000 men, but that he must not let a battle develop on and should move forthwith. Accordingly, on that morning, the 4th of August, the British army filed off to ards Arzobispo, where it crossed the river with its artillery, stores, and 3,000 wounded from Talavera, and took a position on the other side. Thus the British army was saved from impending disaster. Here ended the fighting campaign of the British for 1809.
Sir Arthur Wellesley now moved his head-quarters to Deleózas, and afterwards to Jativa, on the high road to Baza, in the rear-guard of the army. He had just learned that the bank of the Tagus had been abandoned by the French army in Spain, and the enemy was crossing the river. The bridge of Almaraz had already been broken by the Spaniards. Cuesta, following the British movement, passed to the south of the Tagus by the bridge of Arzobispo, joined the British, the French, who had discovered the ford, crossed the river on the 8th with a numerous cavalry, overpowered the Spanish rear-guard, and seized the guns. General Wellesley however caused the remainder of the Spanish artillery to be dragged to the mountains of Mesa d'Olive, a strong position where the British guided the retreating strong pass of Mirabete, facing the bridge of Almaraz. The line of defence of the Allies was thus re-established. Meanwhile King Joseph preached Mortier's corps, which had crossed the Tago at Arzobispo, to retire to the Mountains of Sierra Morena. Scarcely 2000 men remained, who had ags in advanced to Almonacid, near Toldeo. Marshal Ney, on the other side, whom Soult had directed to fortify the Tago below Almaraz, could not dis-cover the ford. Soult now proposed to march with his three corps by Coria and Abrantes, and reach Lisbon, by the right bank of the Tago, before the English; but Ney, Jourdan, and King Joseph opposed the plan, and soon afterwards a dispatch came from Napoleon, dated after the battle of V. de la H. from the Austrian army in Portugal. Carnot, at the same moment, forbidding further offensive operations till the reinforcement of the French army, which had made the Austrian troops at Mantua, and thus 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 naval force on the western frontiers, in which he was cheaply as well as by means of the reconquest. The proportion of cavalry in his armies in Spain was beyond all precedent. Napoleon resolved to play a safe game. He had already 200,000 men m in Spain, and yet he did not think them enough. His generals had adopted the same views. "It is large, it was only, the strenuosity that you can form, that will succeed," thus wrote Soult to King Joseph before the battle of Talavera. It is worthy of remark that Sir Arthur Wellesley, writing about the same time, said that the French had only 12,000 men in large.

Soult's army now went into cantonments in Estremadura and Leon, near the borders of Portugal. Sebastián 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 Duro and Viscount Wellington. The news of the line of the Guadiana. His chief motive was the neglect of the Spanish armies in supplying his army with provisions, and the absence of the troops of Portugal; and another reason was, the impossibility of cooperating with the undisciplined Spanish armies. Lord Wellington had contrived, notwithstanding Cuesta's neglect, to carry away 2000 sick and wounded from Talavera; the remaining 1500, whom he was obliged to leave there, he 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 reconnoitre the whole country in front of that capital, for it was then that he resolved on the construction of the celebrated lines of Torres Vedras, which enabled him to batter all the efforts of the French in the following year. We can only refer the reader to the 'Memorandum' which 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 positions, the entrenchedments and redoubts, 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 the clear evidence of Wellington's sagacity, his penetration, and his fitness for command. (See 'Dispatches,' vol. v., pp. 234-39). Of his plan however nothing was said or even whispered at the time. He returned to his head-quarters at Badejo, where he made an excursion 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 Hadda. At the same time another fatal blunder was committed by the French. The Duke of Angoulême, and the Duke of Orleans, with the little army of the Extreme brothers, Junta ordered the army of Andalucia, joined by the greater part of the army of Extremadura, to advance suddenly upon Madrid, and this without any previous communication with Wellington, or the King of Spain. The Duke of Angoulême, or, with the Duke of Parque and other Spanish commissioners, went to Granada, Venegas, the general of the army of Andalucia, had been super- eived by Areizaga, an inexperienced young officer, who was in favour with the Junta. Old Cuesta had also retired, and made their move with a very small army of Extremadura. These two armies, which constituted the principal regular forces of the Spanish, and which, posted within the line of the Tagus and along the range of the Sierra Morena, protect-ed, and might long have protected, the south of Spain, was moved into Estremadura, with nearly 50,000 men and 60 pieces of artillery, advanced into the plains of La Mancha, and was attacked on the 18th of November, in the open fields of Ocaña, by the two French corps of Soult and Sebastiani; 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 de Parque, with 9,000 Sarral army, was posted at Aragon, and a line of intrenchments along the Sierra Morena, against Kellerman, but he was beaten, and driven to the mountains of Peña de Francia. The French, north of the Tagus, were thus left at liberty to attack Ciudad Rodrigo and Caceres, "in a moment," thus Lord Wellington writes from Badajoz to the news from Lisbon, "I am cordially convinced that such a cause as this would be completely lost by the ignorance, preoccupation, and mismanagement of those to whose direction it was intrusted. I declare that, if they had prosecuted their two armies, or even one of them, the cause was safe. The French could have sent no reinforcements which could have been of any use; they would have been gained; the state of affairs would have improved daily; all the classes were in favour of the same cause, and had nothing, by any division on the continent, or by the growing discontent of the French themselves with the war, the French armies must have been driven out of Spain. But not a thing will answer except to fight great battles in places in which the defeat of the Spanish armies is es-tas as is the commencement of the battle. They will not credit the accounts I have repeatedly given them of the superior numbers even of the French; they will seek them out, and they find them in vain. I am only afraid now that I shall be too late to save Ciudad Rodrigo, the loss of which will secure for the French Old Castile, and will cut off all communication with the northern provinces, by the Castile, and all save them to the north-west.

Lord Wellington's cautious looks now were 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 Alemtejo with the mass of his army in December, crossed the Tago at Abrantes; and thence marching to the Mondego, fixed his head-quarters at Vise in January 1810, having his outposts along the frontiers of Spain towards Ciudad Rodrigo. He left General Hill's division south of the Tago to protect Alemtejo. In the mean time Beresford and Bencesfort were indefatigable in their endeavours to raise the Portuguese regular army to a state of efficiency in numbers, armament, and discipline. Campaign of 1810—The part of the campaign of 1809 General Wellesley had delivered Portugal from the French. By 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 to assist the Spaniards in driving the French 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 battle fought by Wellington on Spanish ground, was a glorious result to the British army, but the result, and the British general was obliged to evacuate Spain. Fresh blunders on the part of the Spaniards led to the conquest of Andalucia by the French. The way 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 30,000 to 40,000 men, which he considered to be the effective strength of the army, 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 Malplaquet, 25th March, 1809, some days before the retreat of Talavera. In that remarkable letter he gives his opinion, 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 letter, merits every military authority, and I 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 forms, and by furnishing the troops with those poor resources under the system of terror, which first stopped the Allies; and that 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. They have not only deprived their French subjects in Spain, as they did everywhere else, of 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 do this.

Wellington's thoughts were now directed to the defence of Portugal, of the practicability of which he entertained little or no doubt. He did not mean that he should be able to make an effective resistance on the frontier of Portugal, for that is extensive, and is open on too many points, but that he could secure the capital and other strongholds, and the mountains and fastnesses, so as to maintain his hold and tire out the invaders. The question whether Portugal was worth defending at the enormous cost at which it would be necessary to defend it, he left for ministers at home to decide. As long as the British kept possession of Portugal the French tenure of Spain was insecure; and circumstances might, and indeed must, render Britain and Spain more and more dependent upon each other. Portugal could send out of Portugal to renew a regular war in Spain for the final expulsion of the French. Napoleon was well aware of this, and was anxious to expel the English from Portugal, for that country formed the position of support for all military operations against England, in the Peninsula. ("Dispatches," vol. i. p. 368.) The Portuguese in a body had confidence in the British nation and army, they were loyal to their prince, detested the French, and their troops had submitted to British discipline. Portugal was a sincere and tolerably decided ally of England, which Spain was not and could not be. In an official letter to Lord Liverpool, dated Badajoz, 14th of November, 1809, after he had given directions for fortifying the lines near Lisbon, Wellington stated that Portugal might be defended by a British effective force of 30,000 men, in aid of the whole military establishment of Portugal, consisting of about 45,000 regulars, which however were as yet far from effective. And in a confidential letter also to LordLiverpool, on the same date, he says—"I do not think the French will succeed in getting possession of Portugal with an army of 70,000 or even of 80,000 men, if they do not make the attack for two or three months, which I believe now to be impossible. I conceive not only that they may but will make the attack, and before they will succeed to the north of Spain. The centre of Spain, or old Castile, is already subdued. . . . My opinion is that the enemy have neither the means nor the intention of attacking Portugal; or, if they do, and will make the attempt, before they will succeed to the north of Spain. The French armies in Spain had received reinforce-ments during the winter from Germany, in one of which the division of Marshal Beresford, and Drouet, with two fresh corps, had entered Spain, followed by a part of Napoleon's imperial guard. Sir Kilkenny, and Lisbon with about 80,000 men, were in the course of march. And the French were preparing for an attack upon Portugal. As a prelude they had been joined by Astorga from the Spanishiards, and were making preparations for the siege of Ciudad Rodrigo, which was defended by a Spanish garrison.

However, the road of Spain, with Victor Mortier under his orders, and was busy in organizing his military resources and establishing his military command in Andalusia. There is a very interesting report by Souta de la Prada, at the end of August, 1809, which is given in the Appendix to Napoleon's Memoirs, and which shows the activity and administrative abilities of that commander, and, at the same time, the misunderstandings between him and the nominal King of Spain, Joseph Bonaparte, and his Spanish ministers. General Regueru in Extremadura, ready to co-operate with his comrade in the north in the invasion of Portugal by either bank of the Tagus. His movements were anxiously watched by Gérard Hill, with about 12,000 British and Portuguese, stationed at the mouth of the Tagus. Marshal Beresford, with his 30,000 men of Spain, Cadiz, by its situation, was garrisoned by British force, of about 7000 men, under General Graham, in addition to the Spanish troops; and the French, under Victor, were blockading the place. In the north, the Spanish army had crossed the Douro. Wellington did not consider the French army in Portugal in sufficient force to effect any powerful division. In the east of Spain, Valencia and Murcia still held out, by Catalonia was the only province in which the Spanish under O'Donnell and a part of the Spanish generals, but it is a regular system of warfare against the French. O'Donnell was assisted by the nature of the ground, which was impervious with numerous fortresses, and also by the British squadron along the coast, and by the organisation and activity of the inhabitants, which made the entrance of a large army impossible. The province was too remote to have any influence on the operations in Portugal and Andalusia. The conquest of Portugal was the great object of the French campaign of 1810. About the middle of May Marshal Masséna, Prince of Salm, arrived under an alliance with 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 Catalonia, Aragon, and Murcia. Wellington, under Regueru, 6th corps under Ney, and 8th under Junot, and the reserve cavalry under Monbrun—total 72,000 men under arms for the field, besides garrisons, detachments, &c., in the provinces of Valladolid, Burgos, Guadalajara, and also Aragon, which, in the course of the campaign, the 9th corps, under Drouet, consisting of about 18,000 men. Lord Wellington had to oppose the whole of this force with about 54,000 British and Portuguese regulars. There was moreover a considerable number of Portuguese militia, employed mostly in the garrisons and in the provinces beyond the Duero, in Alemtejo and Algarve—short range, on the wings of the regular force. It must be observed also that Masséna could concentrate his whole force for his attack on Portugal north of the 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 Andalusia, which was not 80,000 strong, of which a part might attempt to come into Alemtejo. Masséna's troops were mostly old and exhausted, inured to the service of the French, and of a very defective in organisation as not to be trusted in the open field. Marshal Beresford however had taken great care with the Portuguese regulars, many of the officers were English, and Lord Wellington had brigaded several of his regiments in Portugal. Early in June the French invested Ciudad Rodrigo about in sight of the British advanced division, which was posted on the Támesis. On the 28th they opened their batteries on the Spanish governor, a brave old officer, defended till the 10th of July, when, a practicable breach was made.
The French entered the place by capitulation. Wellington could not risk his army for the relief of Ciudad Rodrigo; his 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 dispatch to Lord Stratford. He had, he says, been informed that the enemy was about to make a descent on his army to the valley of the Mondego. Another considerable force occurred in Massena's movements, but on the 16th of September the French army began their march down the valley of the Mondego via Coimbra, through Viseu. "There is certainly," Lord Wellington observed, "many bad roads in Portugal, but the enemy has taken decidedly the worst in the whole kingdom." Wellington, who had retired by the left bank, then crossed the river, and took up a strong position from a hill along a high ridge called the Serra de Busaco, which extends from the Mondego northwards. General Hill joined Wellington with his division from the south, leaving some troops on the left bank of the Mondego to secure the high road to Lisbon on that side. With this exception Lord Wellington's whole army was collected upon the Serra de Busaco. On the 26th of September the French army, consisting of the 2nd, 6th, and 8th corps, assembled before it, took place. On the 27th the French attacked in great force both the right and the left of the English position; one French column reached the top of the ridge, and was in the act of deploying when it was repulsed by General Picton's division, as well as another attack on the right. And on the left the French were likewise repulsed and thrown down the hill by a charge of the bayonet from Cranfield's division and a Portuguese brigade. The French lost one general and about 1000 killed, two generals and about 5000 wounded, and one general and several hundred men 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 actual situation of circumstances; it is evident that the trouble which has been taken with them has not been thrown away, and that they are worthy of contending in the same ranks with British troops in this interesting cause, which they afford the best hopes of saving." (Dispatches, vi. p. 478.)

One of the motives 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 way of the enemy with their goods and provisions, especially from Coimbra, which was then taken, but so much wounded, that the effect were ill obeyed. Massena did not attempt again to force the position of Busaco, but moved off his army by the pass of Buialva, in the mountains north of Busaco. Lord Wellington had directed Colonel Trant to occupy this pass with the Portuguese; but Trant did not arrive till too late and too small a force, the French cavalry was hovering on the flank and rear of the British, which gave the French a free hand. The French entered the forsaken city, where they found ample stores of provisions.

On the 29th of September the Allies quitted the position of Busaco, and, crossing the Moumgue, 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 ran away with whatever moveables they could carry, and the sick, the aged, and the children, on carts, mules, and donkeys, not knowing whither they were going, and encumbering the road, whilst the British cavalry was hovering on the flank and rear of the French. The French entered the city of Coimbra, which fell very quietly, and occupied it without resistance.
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 Aruda, which was rather a weak point, and passed along the east bank of the Tagus near Alcacer do Sal. Then there was a longer and strong redoubt; it then passed across the valley of Ziberdeira and skirted the ravine of Runa to the heights of Torres Vedras, which were well fortified; thence the line followed the course of the little river Zindare to its mouth on the northern bank of the Tagus. The second line was a parallel line between the sinuosities of the mountain tract which extends from the Tagus to the sea about 30 miles north of Lisbon. Lord Wellington's head-quarters were fixed at Perao Negro, a little to the north of the centre of the second line, and the selection of this post 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 Quintella on the Tagus, by Bucelas, Monte Cisande, and Mafra, to the mouth of the little river St. Lourenço on the sea-coast, and was 24 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. The second line was secured by barriers, and stockades with loopholed posts. In the rear of the second line there was a line to secure the embarkation of the troops, should that measure become necessary, enclosing an entrenched camp and the Fort of St. Julian. More than 100,000 and 600,000 of the army 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 Romanía, 50,000 strong, came from Estremadura to join the army of Lord Wellington, and 40,000 Spaniards and 60,000 regular troops posted along the first and second lines (Dispatch to Lord Liverpool, vol. vi. p. 585), besides the Portuguese militia and artillery which manned the forts and redoubts and garrisoned Lisbon, and the English marines which occupied the line of embarkation, a powerful fleet in the Tagus, and a flotilla of gun-boats flanking 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 engineer officers.

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 bivouacs in front of the right and centre of the line of Sedan, leaving only two or three ottas in his rear. He established his depot and hospitals, and commenced forming magazines at Santarem, and for this purpose sent moveable columns to scour the country for provisions, for he had entered Portugal without magazines, every man having brought a certain number of days' provisions; he had even thrown 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 Spanish frontier. Wellington was in march for Lisbon, as they thought, Colonel Trant surprised 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, keeping an eye upon Massena, who was obliged to move back a whole division to hold them in check. Towards the end of October, Massena sent 2000 men along the Mount Abrantes, in a communication with Spain by the way of Castello Branco; a few volunteers were sent to Coimbra in a strong escort by the way of Penamacor to Ciudad Rodrigo, whence he hastened to Paris to inform Napoleon of the real state of affairs in Portugal.

Massena made up his mind to throw all his army into the fight. He attacked Oporto with 70,000 men, of whom 18,000 had been either killed or taken prisoners were in the hospitals; his army became very sickly in consequence of privations and of being exposed to inclement weather mostly without shelter, and bivouacking in low grounds. On the 15th of November he began a retrograde movement, with great order and caution, for the purpose of placing his army in cantonments for the winter. On the 17th the French second corps was established at and near Santarem, in a very strong position; the eighth corps at Pernas; and the sixth corps at Thomar, farther in the rear. Massena was in the opinion of the Radetsky's corps, light divisions and cavalry followed the French movements and took some prisoners, but nothing of importance occurred. Lord Wellington, leaving part of his troops in the lines, moved forward the remainder towards the Rio Mayor, which separated the two armies, and when his whole 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. Thus 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 French regular forces on its left flank, and the Portuguese militia 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 place of its main army in cantonments for the winter. Oporto, Coimbra, Abrantes, were 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 Mondego and the country west of the Serra da Estrela, the people of that country hadElementType="Strong"> cast off the provisions carried on the French army 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 with drew his army and began the retreat towards the towns of Thomar, Pernas, Torre Nova, and Golegão inhabited and untouched. The corn-mills, little injured, were quickly repaired; cattle and corn were procured in abundance, especially from the fine plains of Golegão, which supplied them with Indian corn, and the French thus obtained provisions during the whole part of the winter. And, what was worse for the Allies, a number of boats were left behind at Santarem on the right bank of the Tagus, by means of which the French had the power of crossing the river whenever they liked. This annoyed Lord Wellington more than anything else, and he expressed himself strongly concerning the remissness of the Portuguese Regency in neglecting to give or not enforcing the necessary orders for removing everything out of the reach of the French and for destroying what remained behind. But the French could not have stayed if the provisions had been removed. . . . 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 the power of crossing the river whenever they like. . . . Breaking to contemplate the chance of failure from such obstinacy and folly." (Dispatches to Charles Stuart, the English Ambassador to the Portuguese Regency, October 16 and 18, and November 1.)

The puerile spirit of the Portuguese Regency had manifested itself ever since the fall of Almeida. There was a faction in the Regency, at the head of which was the Patriarch (former Bishop of Oporto), who wanted to control the army in the name of the King. Wellington did not want the French to break the line of communication from Lisbon to Oporto, which would not allow him to be directed by them, they thwarted him in every way. In a remarkable letter addressed to Mr. Stuart from Ovoue, September 7, Lord Wellington had denounced their practices:—"In order to put an end at once to these miserable intrigues, I beg you to inform the Portuguese Government that I will not stay in the country, and that I shall advise the King's Government to withdraw the assistance which his Majesty affords them, if they interfere in any manner with the appointments of Marshal Beresford, and with the arrangements 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 adopt the same course of procedure if the Portuguese Government 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.

YOUR MOST OBEDIENT SERVANT, Lord Wellington says—"You will do me the favour to inform the Regency, and above all the Principal Sousa, that, his Majesty and the Prince Regent, having intrusted me with the command of their armies, and I hereby become so great a man that I will not suffer them, or anybody else, to interfere with 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 yours. If the fortifications are carried away, I am to follow, and 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 tranquility of Lisbon, and for the food of their own army and of the people, while the army can be engaged with the enemy. As for Principal Sousa, I beg you to tell him from me that I have had no satisfaction in transacting the business of his country since he has been a member of the government; that, being embarked in a course of military operations, of which I hope to see the completion of within a month from the 1st of March, I end, but that no power on earth shall induce me to remain in the Peninsula for one moment after I shall have obtained his Majesty's leave to resign my charge, if Principal Sousa is to be the judge hereafter of my conduct.

Either he must quit the country or I will; and if I should be obliged to go, I will take care that the world, or Portugal at least and the Prince Regent, shall be made acquainted with my reasons. . . . I have but little doubt of my success, though the extent of the military gain I shall not know till the end of the campaign, and I cannot make the battles to know that the result of any one is not certain, even with the best arrangements, I am anxious that the Government should adopt preparatory arrangements, and take out of the enemy's way those persons and their families who are in the rear of the troops, and that the removal of this correspondence is absolutely necessary to enable a person to form a just idea of the difficulties which Lord Wellington had to contend with, and of the strength of mind which enabled him to rise superior to them.

Campaign of 1811. During the months of January and February the armies in Portugal remained in the same relative positions. The low lands being flooded rendered field operations impossible. Meanwhile the 9th corps under Beresford had entered Portugal by the valley of the Mondego, with the object of reinforcing Massena's army. By this movement the rear of Massena's army was to be protected, and the army on the Tagus was to be reinforced. Soult, on the other hand, had entered Portugal by the valley of the Douro, with the object of cutting off the army of Soult and Massena. At the same time Soult, who commanded the army of Andalucia, received orders from Napoleon to act in concert with the army of Portugal, which was rendezvoused at the town of Odemira, where a new French army was formed in the north of Spain, consisting of about 70,000 men, and placed under Marshal Belleissie, duke of Istria, who was ordered to support and furnish all necessary assistance to the army of Portugal. Letter from Beresford, Prince of Wagram, to the Prince of Espling (Massena), Paris, January 16, 1811; another from the same to Duke of Dalmatia (Soult), January 24, 1811; and another from the same to Prince of Espling, February 7, 1811; in Appendix to Napier, vol. iii. 14.a Make a bridge over the Tagus at Marchmont, and send a force to meet you. The Tagus form a junction. Meantime 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 lose many men. Besides, people in London are much alarmed about the idea of crossing the Tagus, and when the season becomes favourable let the main operations be carried on south of the Tagus.

Such were the gigantic efforts made by the master of half of Europe. For months on end, every foggy morning, few men only in the beginning of March. But all Napoleon's efforts did not prevail. Massena was waiting for Soult to appear on the left bank of the Tagus opposite to his position, but Soult was obliged to maintain the blockade of Cadiz, in which there was a British garrison of 6000 men; he was obliged to leave Sebastiana on the side of Granada and Murcia to keep in check the Spanish armed parties; and he could not therefore dispose of more than 20,000 men, with whom he dared not enter Alentejo, leaving the Spanish fortress of Badajoz in his rear. He therefore began by attacking the fortress of Olivenza, which he took January 25, and then marched to Badajoz. On the 19th of February he defeated a Spanish force of nearly 12,000 men under General Castaño y Branco, which was posted on the river Góebra, an affluent of the Guadiana, and then commenced the siege of Badajoz.

In the mean time Massena remained in his position at Santarem, waiting for Soult's appearance on the Tagus, till he became sure of his rear. He delayed no longer. All the means of collecting provocations by violence were exhausted, large moveable columns had been sent at different times both on the side of Castel Branco and on that of the Mondego, which scourcd the country and changed with every militiaman, even the thin excesses, which were retaliated by the infuriated peasantry upon the French stragglers and wounded. The discipline of the army was broken by this barbarous system of warfare. They had no less than 10,000 sick; they could obtain no provisions, the French were again in full retreat through the provinces long; and would serve the troops during their retreat to the frontiers.

In the beginning of March Massena moved his sick and baggage by degrees to the rear, and after demonstrations in various directions the divisions of his army filed off in the quiet of night, Santarem was recaptured, and the retreat took place on the 6th of March, and next morning it was entered by the English. Massena however had gained two days' march, and his army was not overtaken by the English till the 8th of March, when they joined forces near the village of Pombal, presenting a front of resistance. There was some skirmishing with the light division, whilst Wellington brought up his other divisions, but the French having gained time for their baggage to file off, retreated on the 11th to the rear. The detachments of the English, which were driven by the castle of Pombal was driven away with some loss by the English, and in the night Massena continued his retreat. On the 12th the English advance found N ey with the French rear-guard posted on a high table-land in front of the village of Redinha, but the French skirmishing before them of the English and the French seemed disposed to stand their ground, and made a show of considerable force, Lord Wellington formed his army in line and moved on to the attack, when, after a general discharge from the French batteries, which hit them in crowds; the French were again in full retreat through the village, and joined that evening the main body at Condeixa, where one road leads to Coimbra and another ascends the valley of the Mondego. Massena's intention was to seize Coimbra and, if possible, Oporto, in order to form a line of retreat, and to continue the line of the Mondego, which was fordable in many places, and retire across the Douro, removing all the boats. Coimbra was thus necessarily left to a surprise by the French retreat army. But it luckily happened that Trant lingered behind at Coimbra with a small force, and, having destroyed one arch of the bridge, and placed guards at the fords, he 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 Monbrun appeared at the suburb of Oporto, and on the 12th made an attempt to force the bridge, but his men were repulsed by grape-shot. Monbrun fancied that Trant had been reinforced with some English regiments by sea, and having made his report, Massena relinquished the idea of continuing his retreat, and turned upon Coimbra by Ponte de Murcelda 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 order to follow the British army, which he had left turned by Picton's division, which had marched by a path over the mountains of Anciolo. 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 into the same, and under the town of Mondego, until night stopped any further pursuit. By the aid of darkness the French got together again, and on 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 division's
of beasts of burden to be destroyed. The inhuman fellow charged with the execution harried 500 assed, and left them to starve, and thus they were found by the British troops. The lines of the road were thus rendered difficult and griefer visible in these poor creatures' looks wonderfully roused the fury of our soldiers, and so little weight has reason with the multitude when opposed by a momentary sensation. General Lord Wellington, habitually sober in the expression of his sentiments, assumes even a more decided and indignant tone on the same occasion. In his official dispatch to Lord Liverpool, dated March 14, after detailing the movements of the French to that day, he thus continues: "I am duty bound to add to this account that their conduct throughout this retreat has been marked by a barbarity seldom equalled, and never surpassed. Even in the towns of Torres Novas, Thamar, and Fornos, in which the head-quarters of some of the army—rear-guard—were established, and the French commander-in-chief, in which he told the inhabitants of Portugal that he was not come to make war upon them, but, with a powerful army of 110,000 men, to drive the English into the sea." (Dispatches, vol. viii., p. 306)

On the 26th of March the French abandoned Celorico, but retained the position of Guards. On the 29th however Lord Wellington moved his columns up the steep hill of Guards, when the French retreated to the Coa, without firing a shot—the rear-guard in excess of 7,000, and the 2nd of April the British army came up with them, and found them posted on the right bank of the Coa. On the 3rd the light division passed the Coa on the left of the French, and drove in their light infantry; but the main body of the French advanced, and succeeded in crossing the Coa, and the other of the light division could not see that they were pushing too far. When the weather cleared up, the French, seeing that only a small force had crossed the river, attacked it in columns with cavalry. Three times the 43rd and 54th regiments were driven back with us, but they rallied and beat back the enemy. At last, Pieton's division having crossed the Coa, and the 5th division also making its appearance by the bridge of Sabugal, the whole French army retired upon Alveias, having sustained considerable loss in men and also in horses. This ended the combat of Sabugal, in which the light division lost about 200 men. On the 4th the French were about Aldeia da Ponte and Aldeia Velha, on the extreme frontier of Portugal, and on the 6th they crossed the Minho, which the bugles of the third and last French invasion of Portugal. They left a garrison in Almeida, which was blockaded by the English. "The enemy's loss in this expedition to Portugal is immense—I should think not less than 45,000 men, including the whole class of cavalry; excellent regulars, and the 2nd corps, they may have now 40,000 men on this frontier." (Dispatches to Lord Liverpool, April 9, 1811). A great part of the loss of the French, in killed, was from the hands of the Portuguese peasantry, who revenged themselves for the injuries which had been inflicted on their countrymen during the six or seven months that the French had remained in Portugal, by killing every straggler whom they could lay their hands upon before the British columns came up. Dismal scenes of suffering and death presented themselves along the whole line of retreat. The dead were left in an unburied state, generally naked, arms broken down on the road, carcasses of horses and mules. Some of the poor creatures seemed to have
rawled or been dragged out of the road to die beneath the stone walls with which the fields are enclosed; and, on looking over the stone walls into the fields, they were seen lying in clusters of three or four or more, in all sorts of positions. Portuguese villagers, men and women, were occasionally seen Morto de Batalhão, who had been in command, des and Frenchmen on the road, when they were properly reprovéd and driven away by a British non-commissioned officer. It was chiefly in the mountain ranges of the Serra de Estrela that the work of destruction had been carried on by the French and their allies, who, having been in possession of this valesse of Portugal in the beginning of the year, had been forced to retire before the winter. The males were soon despatched—the females paraded for a time, but not in mercy. It happened however it times that these marauding parties were small, and they were captured by the peasantry, who gave no quarter.

The orders given by the Regency of Portugal at Lord Wellington's request, for the people of Beira and Estremadura to withdraw from the open country upon the advance of the enemy, had caused a vast influx of population within the lines of their defences. When it was announced that the army was partly by their own countrymen, and partly by a gift of £0,000, voted by the British Parliament, and by subscriptions raised in England. After the retreat of Massena they returned to their homes, when the poorer class received ưured, enduring the remainder of that year and the following winter.

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 lines of the enemy, and was accompanied by all the alié soldiers. The French General Mercier, having been utterly defeated by the British in the preceding February, had invested the entire town of Almeida, and was at this time commanded by a general of his own military character. Lord Wellington could muster no more than 32,000 men, of which force only 1900 were cavalry. He however determined to fight rather than give up the blockade of Almeida. He drew back his army to the north of the town, and then directed a detachment of an extended line on a table-land between the two parallel rivers Tunores and Des Casas, which are affluent of the Agueda; his left on Fort Conception, covering the blockade of Almeida, and his right at Fuente de Oiio, extending towards Nava d' Aver, on the road to Sabugal, the whole distance being nearly seven miles. He had the Coa in his rear, with the bridge of Castello Born in case of a retreat. The front of the British position was protected by a defensive line of trellis-work passing through a deep ravine, in which lay the village of Fuentes de Oiio; but to the right of this village the table-land turned back towards the Tunores, leaving a plain between it and the hill of Nava d' Aver. The French advanced in three columns, which took different routes, one of which overhanging the village of Fuentes de Oiio, and nearly parallel to that occupied by the Allies. They then attacked the village, which was stoutly defended by the British. The French in one time took possession of part of it, but were charged and driven away by a fresh brigade of British infantry. Night put an end to the fighting. The Allies lost about 300 men, and the French somewhat more. The next day, Massena, who had been joined by Besières with a body of the Imperial Guards, re-entered the position of the Allies; and on the 9th of May he made a grand attack with the greater part of his force on the British right, which he expected to turn by the plain which extends between the hill of Fuentes de Oiio and that of Nava d' Aver, and then pass through the Tunores, and drive the British, which last stream flowed in the rear of the British position. Had they passed the Tunores, the French would have spread into the open country about Frenada, and cut off the English from the Coa. The French, crossing the Des Casas at the foot of the hill, passed through a ravine called No Velho, and drove him from Nava d' Aver; they then charged the 7th and light divisions, which formed the British right. The light division immediately formed into squares; but the numerous French cavalry fell upon the 7th division before it could effect a like formation, and came on with great firm; and although some were cut down, the enemy was checked by the steady fire of the Chasseurs Britanniques, a foreign regiment in the British service, and of other regiments of the 7th division. Lord Wellington however, considering his position too far extended to the right, gave

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The total loss of the French was 230 killed, 1254 wounded, and 324 missing or taken prisoners. The losses of the French in the battles of Fuentes de Oñoro, Cañada de Meza and Almeida were thus very great. The number of 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, but the wrath of the French was a result of 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 importance, being a regular pitched battle fought by the Spanish in a position of some strength. The French were very weak in one point, under great disadvantage of numbers, and especially of cavalry. The great majority of the troops engaged were British, for the Portuguese were mostly with Marshal Beresford in the south. There were only four regiments of Portuguese on the left of the French, and these were cavalry engaged 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 town. Beresford directed his batteries to close on the quarter, and withdrew his army beyond the Aguada, 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 Marmont was delivered to Beresford, and it 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. ii, p. 220.)

While these things were 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 took position on the west bank of the Guadiana River. Soult with above 7000 British infantry, several 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 4000 horses, most of which belonged to the cavalry, and more than 100,000 in the baggage. Soult came up with about 19,000 chosen infantry, about 4000 cavalry, and fifty guns. He immediately reconnoitred Beresford’s position, and determined upon an attack on the right flank of the Allies, which was their weak point, though Soult was not aware that Blake 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 cavalry at his back. Blake’s division was in the field, and Soult accustomed 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 part however was stiffly 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, closed upon the village, the passage must have been forced, and the left of the French would have been dislocated. Warren, 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 batteries were opened. At one time the fighting was on the banks of the stream, and amongst the lower houses; at another upon the lower heights and round the chapel, and some of the enemy’s skirmishers even penetrated close to the town towards the main position but the village was never entirely abandoned by its defenders; and in a charge of the 71st, 79th, and 88th regiments, led by Colonel McFinnon, 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 crows, and the French retiring a cannon-shot from the stream. (‘History of the Peninsular War,’ iii. 514-16.)
front column, and what remained of Houghton's brigade could no longer maintain its position. The ground was
heaped with dead bodies, and the Polish lancers were riding furiously about, causing the artillery on the upper part of
the hill. General Cole at the head of the lancers, flanked by a battalion of the Portuguese Legio and a heavy
infantry, disarmed the lancers, captured the guns, and appeared on the right of Houghton'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 and decided refusal from the Allied forces, in
preparation to separate itself from the confused and broken multitude,
startled the enemy's heavy masses, which were increasing
and pressing onwards as to an assured victory: they wavered,
hesitated, and then, vomiting forth a storm of fire, hastily
shattered the lines of the French. A sudden burst of grape
from all their artillery whirled through the British
ranks. Sir William Myers was killed, Cole, and the three
colonels, Ellis, Blakeney, and Hawkhawke, fell wounded,
and the fusilier battalions, struck by the iron tempest, reeled
and staggered like sinking ships. Still with blood and
recovery, they closed on their terrible enemies, and then
was seen with what a strength and majesty the British
soldiers fought. In vain did Soult, by voice and gesture, animate his
Frenchmen; in vain did the hardest veterans, extolizing the
brave and the famous, bid them make the last exertions to
re-cover the ground they had lost and gain time for the mass to open out on such a fair field; in vain
did the mass itself bear up, and, fiercely arising, fire
indiscriminately upon friends and foes, while the horsemen,
hovering on the flank, threatened to charge the advancing
line, and so force a battle to a close. A 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
measure of force was no more a sure guide to the
position of the enemy, but the head of every
formation 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 very formidable column.
In the south, General Hill effected a gallant achievement
by surprising the French General Girard, with 4000 foot and
1000 horse, at Arroyos de Molinos, in the neighbourhood of
Estremadura, in the direction of the Tagus, and joining these
forces with those of General Merida, in the right, to
prevent any combination of forces from the right that part of Estremadura being thus delivered from the
enemy.
Lord Wellington, in the second part of 1811, besides having
firmly established his complete possession of Portugal,
had by his operations within the Spanish frontiers, both
north and south of the Tagus, given full employment to two
French armies, each commanded by a French marshal of
high reputation, and prevented them from acting with vigour
against Cadiz in the north or against Cadiz in the south.
He had thus fulfilled the promise which he had made the year before, that he would make the best of his
power to drive the French from Portugal, and to make it a position of support for future operations against the French in Spain, and he continued to hold the same language to ministers at home. ("Dispatches," March 24, 1811, vii. p. 362.)
In eastern Spain, however, the French had obtained in
1811 great successes against the unassisted Spaniards.
They took Tarragona by storm in June, when a horrid butchery
of the unarmed population took place, without regard to age or sex, by which, it is said, 50000 persons fell, and
in the same place, 13000 were taken prisoners; but, by a
brave Catalonian, undismayed, continued to carry on the
war with unabated zeal. The Spanish General Blake, after
being defeated by Soult near Valencia, shot himself up in
that city with his whole army, the last Spanish army which
had to fight, and in it, the Duke of Medinaceli, and in
1812, he capitulated with 18,000 soldiers, 23 general officers,
and between 300 and 400 guns. "I believe," observed Lord
Wellington, at the time, "there is no man who knows the
state of affairs in that province, and has read Soult's account of
his action with his own eyes on the 29th of October, who does
not believe that, if Blake had not fought that action, Valencia
would have been safe. Are the English ministers and
generals responsible for the blunders of Blake?" ("Dispatches," vii. p. 390.)
Campaign of 1812.—Lord Wellington from his head quarters
at Fremada, near the Cos, where he had been apparenly
quiet during the latter months of 1811, had been preparing in secrecy the means of recapturing the important
fortress of Ciudad Rodrigo. Under the appearance of repair-
work and fortification, the troops had been partly
in train and abundant stores. A portable bridge on
trestles was also constructed in the same place. He also
affected the formation of a commissariat waggons-train, with several
hundred wagons constructed for that purpose, to
supersede the rude carts of Portuguese construction which
had been hitherto used as a means of transport for the army,
but which would have often proved quite insufficent without
the assistance of a large body of Spanish miles and nucle-
ted, which formed the main part of the divisions of the
British army. By the exertions of the engineer officers the
river Douro had been rendered navigable as far as the
confluence of the Agueda, that is to say, forty miles higher
than boats had ever before ascended it. All this was done
with such skill and industry as the enemy does not seem to have anticipated any attack upon Ciudad Rodrigo,
but for the remainder of the winter. The French
marched had placed his army, the 'Army of Portugal,' in
extensive cantonments about Piasca, and, towards the
beginning of the month of October, he laid siege to the
fortified town of Asturias. Suddenly, Lord Wellington,
on the 6th of January, 1812, moved his head quarters forward to Gallegos, and
the Tagus, and in the course of that affair, he had
imme-
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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 up to the 17th, and that very evening orders were given to storm the place. No time was to be lost, as Marmont 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 54th and 15th Light Infantry, were ordered to storm 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 to Lord Wellington, May 31st, 1804.') Few of those who had been under General British was severe. General Mackinnon and many of his men were blown up by the explosion of a magazine on the rampart, which took fire accidentally. General Craufurd, the gallant commander of the light division, was mortally wounded, and died shortly afterwards. General Vandeleur and Colonel Colborne were also wounded, as well as Major George Napier, who led the storming party on the left. The total loss of the British and Portuguese amounted to about 1000 killed and wounded. The loss of the sortie, for it was estimated at about the same, besides 1700 prisoners. A large battering-ram and a vast quantity of ammunition and stores were found in the place.

Marmont heard at Valladolid, on the 16th of January, of the breaches and operations against 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 Beresford: 'The English opened their fire of musketry from 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 Tacons, as they were called, were the object of 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 himself and his brave army, annexed the title of annuity of 2000l.

Having repaired in some degree the works of Ciudad Rodrigo, Lord Wellington placed it under the command of a Spanish officer, Mortoni. The move of the south, for he had made up his mind to take Badajoz, if possible, before Marmont and Soult could unite for its 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 conveyed to the Tagus. The Allied river division, under Beresford, then advanced by land across Alentejo to the banks of the Guadiana. On the 6th of March, leaving one division on the Agueda, Lord Wellington marched the remainder of his army to the south. On the 16th the army crossed the Guadiana, and Badajoz's division had taken the castle, by escalade, and soon advanced to Llerena and Merida to cover the siege. On the 26th, the Picurina, an advanced post, separated from the body of the place by the small river Villas, was taken by storm, and on the 28th two breach batteries opened their fire on the town. In the mean while 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 Sabugal and Penamacor, and ravaged the country east of the Serra da Estrella. Lord Wellington's division moved to the operataions 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 the Allied forces, fortifying itself with ditches around the breaches, but here they found obstacles which appeared insuperable. Planks studded with iron spikes, like harrows, and chouets-de-frise formed of sword-blades, effectually stopped the way, and the ramparts and neighbouring buildings were occupied by light infantry, who showered their volleys upon the assailants. Shells, hand-grenades, every kind of burning composition, and missiles of every sort, were hurled at them. At last Lord Wellington ordered them to withdraw just as a report came that General Picurina himself was severely wounded, and on the 31st the southward General Walker's brigade also entered the town by escalade on the side of the Olivença Gate. The other divisions then formed again for the attack of the breach when all resistance ceased. The French governor, General Phillipon, with a few hundred men, escaped across to the Guadiana near San Chuvisco, where he made a demonstration the following morning. Great excesses and outrages were committed by the soldiers during the remainder of the night, until severe measures on the part of Lord Wellington restored order. The loss of the Allies was much more severe than that of the British, 550 men being killed; and 3000 officers and men wounded. "When the extent of the night's havoc," says Napier, "was made known to Lord Wellington, the firmness of his nature gave way for a moment, and the pride of conquest yielded to a particular interest in the sufferings of the unfortunate French." Soult collected his army at Villarreal, between Llerena and Merida, on the 5th, when, hearing of the fall of Badajoz, he retired before daylight next day towards Seville, pursued by the army of Portugal, which made a successful attack on his rear-guard at Villa Vara.

On the 13th 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 siege of Badajoz, and took a position near to Salamanca. Lord Wellington's head-quarters were again at Guiniaso, between the Casa and the Aguessa, where they remained till the middle of June, nothing of importance occurring in that quarter during the interval. In the south, after a long absence, the Allies returned in May, the forts which the French had constructed at Almaraz 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, left Salamanca, and on the 14th arrived at Tore do Douro and the British advance took a position near to San Cristoval, a few miles in front of Salamanca. An attempt was made to carry the forts by escalade, which failed, and Major-General Bowes and 130 men fell in the attack. On the 20th Marmont moved forward again, and, arriving in front of the position of San Cristoval, came to a halt with his cavalry in the plain, but it 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, cavalry, as well as of the British and Portuguese infantry. By his manoeuvres however Marmont succeeded in see-
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 occupied the main lines of the Guareña. More manœuvring 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 Villamasa. Lord Wellington followed in his turn, and, having crossed the Guareña on the 1st of July, he aimed at establishing his army 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 my communication with Salamanca and Ciudad Rodrigo, the weakness of which I have already pointed out. 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 should follow the example of the French, and lay waste whole districts in order to procure a sea us; indeed I believe that the fortiﬁcations of Madrid are the strongest, and it is certainly equipped with a perfection of artiﬁce."

The French army in Castile has never had any secure communication beyond the ground which they occupy; and, provided the enemy continues to hold the same, there seems to be no difference in respect to the quarter from which their operations are directed, or on which side they carry them on. The army of Portugal has been surrounded for the last six weeks, and some time longer. The 4th division, which is in the rear of the left, had a situation similar to that elsewhere, and is composed of a system of organised rapine and plunder, and the extraordinary discipline so long established in the French armies, enable it to subsist at the expense of the total ruin of the country in which it has been placed, and I am not certain that Marshal Marmont is not now more exposed to a greater quantity of provisions and supplies of every description than we have.

I have invariably been of opinion that, unless forced to fight a battle, it is better that one should not be fought by the allied army unless under such favourable circumstances that in time of battle the left wing of our army, and the left wing of the allied army would be able to maintain the field, while that of the enemy should not. Your lordship will have seen by the returns of the two armies that we have no superiority of numbers even over that single army immediately opposed to us; indeed I believe that the French troops of Madrid are the strongest, and it is certainly equipped with a perfection of artiﬁce.

The cavalry was numerous, and his artiﬁce formidable. Lord Wellington directed a fresh attack, and the 6th division, ascending to the enemy's position under a sweeping fire of artiﬁce and musketry, was not able to maintain the points charged with the bayonet, and the 4th division coming up at the same time the French abandoned the ground in great confusion, retiring towards Alba de Tormes, followed closely by the British till night stopped the pursuit, which was renewed by the cavalry and to the north of the Spanish.

The cavalry came up with the French near La Serna, when three French battalions surrendered, being forsaken by their own cavalry. Clauseau retired by Peñarranda to Arevalo, whence he took the direction of Alba. The loss of the French was very great: 13,700 killed, wounded, and taken prisoners. The 1st, one general, six ﬁeld-officers, 130 officers of inferior rank, and between 6000 and 7000 men taken prisoners, besides two eagles. Their total loss in killed and wounded could not be less than 15,000. Of the dead, 5000 were wounded, but the proportion of officers was very great. General Le Marchant was killed and Generala Beresford, Leith, Cole, Cotton, and Spry, were wounded.

The ultimate though not immediate results of the victory of Salamanca were great, and a French historian, generally in a very warm in the cause of Napoleon, does not hesitate to attribute to the military and political consequences of that battle the ultimate loss of Spain by the French. (Thibaudau, Histoire de l'Empire, ch. 63.) Among the political consequences, it is particularly important to observe the entire decay of the French army, and the victory of Salamanca was a great and wonderful event in the history of the war. The author just quoted says, "We are assured that a negotiation to that effect had been entered into, with which the battle of Salamanca broke off for ever."
the Douro, marched against him on the 7th of August, leaving a force on the Douro to watch Clausew. King Joseph retired to Madrid, and the Allies having passed the Guadara-rama, he abandoned 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 Soult raised the blockade of Cadiz, destroying the works which the French had constructed with so much labour and expense, and, abandoning western Andalucia, concentrated his forces in Granada. His rear-guard was attacked by an allied Spanish and English force from Cadiz, which drove it from the city. The Allies, on the 24th, reached 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 Almanza, in which town he was joined by a considerable force. At the same time, the French crossed the Tagus near Lucina. Lord Wellington took position at the Arapiles, being the ground of his former victory; but as the enemy, through his superior numbers, and especially of cavalry, was in motion towards the north, he withdrew to the Aguada, and on the 18th his head-quarters were at Ciudad Rodrigo. Soult did not follow him close; in fact, the French made no serious movement beyond the Tagus, and soon afterwards they even withdrew a great distance to the south, allowing the Allies to occupy their strong posts. The campaign of 1818 was now terminated.

During the retreat from Burgos the allied troops suffered much from fatigue and privation, the weather was very inclement, the roads were deep and miry, and the rivers were greatly swollen, 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 many days. The cold and rain, together with 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 sent to the Commandants and Generals, in which he directed them to erect cornfolds and to return to their respective quarters. Wellington, 18 Nov., 1817, 28th 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, 1813. On the 3rd of December he received the thanks of Parliament, and on the 7th of the same month the sum of 100,000L. 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 prudent to abandon Madrid and Barcelona, in order to intrust him with a command in the approaching 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 Soult's head-quarters were in eastern Spain. The army still called the 'Army of Portugal,' under General Reille, had its head-quarters at Valla-dolid; that of the centre, under Drouet, was distributed round Madrid; and the head-quarters of the army of the south, under General Gudin, were at Aragon. All these forces were under King Joseph, who was assisted by Marshal Jourdan. Clausew. and Foy commanded separate divisions in Aragon and Biscay. Andalucia and Estremadura were
Lord Wellington had been at 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. The strength of each division of the French army upon which he could immediately rely for field operations consisted of about 35,500 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 Braga with the British and Portuguese forces under his command. On the 3rd of May he advanced in three bodies to the north of the Douro, and on the 6th he crossed the river at its mouth. The French were taken by surprise, and defeated at Vimeiro. With the death of the Duke of Braganza, and the news of the great battle of Albuera, the French had and had been at great pains to strengthen, along the northern bank of the Douro. The French were warned by the British and Portuguese authorities to reinforce, and to take the road to Pamplona, abandoning all their baggage, artillery, ammunition, military chests, and the court equipage of King Joseph, and were followed after dark by the Allies. The French met with the news of the complete defeat of the French on the road to Bayonne, which runs along the left bank, of which they were occupied by two divisions of the French army, and Lord Wellington's army, however the main body of the French army having been driven through the town of Vitoria, the divisions on their right withdrew hastily from their position; and then General Graham, crossing the Zadorra, took possession of the Bayonne road, by which the French were pursued towards the right, and the night was a hot one, the French having put their army into irretrievable confusion. Their columns were obliged to alter their line of retreat, and take the road to Pamplona, abandoning all their baggage, artillery, ammunition, military chests, and the court equipage of King Joseph, and were followed after dark by the Allies. It was the most complete defeat that the French ever experienced in Spain. On this occasion the Spanish divisions under Generals Morillo and Longa, who were in the field with the British and Portuguese army, behaved remarkably well, and were honourably mentioned in Lord Wellington's dispatch after the battle. The total loss of the Allies was 740 killed and 4174 wounded. The loss of the French was stated by themselves at 6000. About 1000 prisoners fell into the hands of the Allies, and over 2000 wagons, 416 caissons, more than 1000 wagons, an immense quantity of ammunition, and all the baggage of the army, and the baton of Marshal Jourdan. They carried away only one gun to Pamplona. King Joseph's carriage was seized, and the purport of the French army was conveyed to the carriage belonging to his court, with ladies, were also taken.

The French, leaving a strong garrison at Pamplona, continued their retreat to France. General Foy, who was not present at the battle, being near Bilbao, likewise fell back to the river on the 6th. The French army retired on the night of the 6th to the south of the river, and on the 9th was concentrated 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 French army consisted of 56,000 men, and the British and Portuguese forces were nearly equal in number, amounting to from 70,000 to 75,000 men each. On the morning of the 1st 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 across the Bilbao road, and cut off his retreat to France by the Bayonne road; the right, under General Hill, was to commence the attack 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 ridge between the towns of Subijana de Alava and the centre, 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 and the road from Vitoria to Pamplona, and his right hand column crossed the river higher up, and turned the French left towards the town of Vitoria. The advancing columns with a destructive fire. General Picton's division, the 3rd, coming in contact with a strong body of the enemy, drove it back, and took its guns. The other divisions coming up, the French abandoned their position, and began their retreat. The English, in the pursuit, overtook those lofty heights which enabled 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 our success from 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 30th of June attacked.
with between 30,000 and 40,000 men, the British right at Benevvalles. General Cole moved to the support of that post, but the French having turned the British position, General Cole considered it advisable to withdraw his men to the rear of the town, and march to Zobiri. In the meantime two French divisions attacked General Hill's position in the Puerto de Maya, at the head of the valley of the Bastan. At first they gained ground, but were again driven back, when the retrograde movements of General Cole, General Hill to withdraw likewise to Hurries. Lord Wellington, who had his head-quarters at Lasana, on the left of the army, heard of these movements late in the night, and concentrated his army to the right. On the 27th the French troops, which were in force on the heights of Sorauren, but were repulsed. On the 28th Soult directed a grand attack, first on the left, by the valley of the Lanza, and then on the centre of the British position. The 4th division (General Cole's) sustained near protracted and heavy attacks, and the enemy the next day began to diminish his army by moving back most of the Spanish troops within the Spanish frontiers.

On the 10th of November the allied army left their cold and cheerless position in the high valleys of the Pyrenees, and took up a position at Concha. Spanish General Soult 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 the Bastan, and, attacked the French troops, consisting of English and Spanish troops under Marshal Beresford and General Alten, carried the works behind Sirre, and drove the French beyond the Nivelle, which the French troops, consisting of English and Spanish troops under Marshal Beresford and General Alten, carried the works behind Sirre, and drove the French beyond the Nivelle, which the French had abandoned 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 right of the Nivelle, and Soult's on the left. The French took possession of the passes in the mountains.

During the month of August, General Graham was pressing the siege of San Sebastian. On the 31st of August the assault was made, and the town was carried, but with great loss of life. The French garrison retired to the castle. Many excesses were committed by the British and Portuguese soldiers after they had entered the town. Most of the houses were plundered, and it was not till the 2nd of September that order was restored by General Sir John Hope, who was appointed to the command of the forces there. The French were in full retreat into the Pyrenees, followed by the allies, who took many prisoners and much baggage. These various combats are designated by the name of the battles of the Pyrenees. On August 27th Lord Wellington took possession of the passes in the mountains.

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 Soult 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 ordered his troops for marching his whole army into France, where they would find the winter accommodations. This was, as the only means of saving the army from the rigors of the French prey. The French were in full retreat into the Pyrenees, followed by the allies, who took many prisoners and much baggage. These various combats are designated by the name of the battles of the Pyrenees. On August 27th Lord Wellington took possession of the passes in the mountains. This occasioned another change in Soult's movements, who again directed several columns against the left of the allies. The troops were occupied in receiving their rations, and had hardly time to form their lines of battle, when their army was attacked, and at the close of the day both armies remained in their respective positions. Marshal Soult now giving up any further attempt on the left of the allies, and imagining that his repeated attacks on that side must have induced Lord Wellington to weaken his right, changed his plan, and planned the night of the 12th moved with his main force to his left to attack the British right. Lord Wellington however foresaw this, and had given orders to the 4th and 6th divisions to support the right, and the third division was held ready. Lord Wellington, with his immediate command above 15,000 men, and his position extended across from the Adour beyond Vieux Montague to Ville France and the Nive. Soult directed from Bayonne upon the little Hillock, and had crossed the river Nivelle, and columns of the enemy gained some ground, but were fiercely repulsed. An attack on Hill's right was likewise successful at first, but was ultimately defeated. Soult at last drew back his troops towards his entrenched camp near Bayonne. General Hill had withdrawn all the efforts of the enemy without having any occasion for the assistance of the divisions which Lord Wellington had moved towards him. Lord Wellington was well pleased, and said, "Hill, the day is all your own.

Nothing of importance occurred during the few remaining days of the year 1812. 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 on the 4th of March he had been elected a Knight of the Garter.

Campaign of 1814.—The mighty contest which had been carried on for ten years between France and the rest of Europe was drawing to a close. The battle of Leipzig (October 1813) had given the death-blow to the ambition of Napoleon. He 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 army had been carried across the Rhine and towards the Ganges by General X. According to his early declarations, constituted the natural frontier of France, but which he had not self-command enough to respect. He was now reduced to the necessity of depending upon the resources of France alone. Lord Wellington had long held the opinion that should come to be the case, the feelings of the French population would turn against him. Napoleon had hitherto supported his enormous armies chiefly at the expense of foreign states.

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 expecting an opportunity. Lord Wellington had long held the opinion that should come to be the case, the feelings of the French population would turn against him. Napoleon had hitherto supported his enormous armies chiefly at the expense of foreign states.

On the 19th of March Lord Wellington moved his army to Vic Bigorre, andSoult 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 left of the Garonne, in front of Toulouse. The object of Soult was to faciliate 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 already done so in the name of Ferdinand. In order to create discord among the Allies. Knowing the character of Ferdinand, he had written to him on the 19th of November, 1813, saying, "That the circumstances of the times male him wish to conclude at once the affairs of Spain, where England was involved, on a footing which would depress 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 keep them from interfering 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. 96.) A treaty was concluded at Valence, in which Ferdinand had been detained a prisoner for violation of the stipulations 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 territory."

At last, in the 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 uselessy cooped up in Catalonia, allowed Ferdinand to return to Spain. Means were adopted to keep Suchet's army in France, and on the 27th Lord Wellington's head-quarters were at St. Sever, north of the Adour. The loss of the Allies at the battle of Orthez was 277 killed, and about 3000 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 Bayonne was now left to its fate, and the road to Bordeaux was open to the Allies. Lord Wellington was ordered to General Hope for the siege of Bayonne, and detached 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, proposed to surrender to the Allies.

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 contaminate a 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 politely to keep incognito, and to wait for some more important demonstration in his favour. When Beresford marched to the south of France, Lord Wellington ordered him not to originate or encourage any rising of the Bourbon party. "If they 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 as long as the public peace is preserved where our troops are stationed, we shall not interfere to prevent that party from doing what may be deemed most for its interest; nay, further, that I am prepared to assist any party which may show itself inclined to aid us in getting the better of Bonaparte. That the object of the Allies, however, in the war, and above all in entering France, is, as stated in my proclamation, peace; and that it is well known that the Allies are now engaged in negotiating a treaty of peace with the Bourbon faction in Spain, may be relied on."

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 Allies, was soon enabled to cut through the enemy's position on the ridge on the right of the French, and General Pack's brigade of the 6th division carried the two principal red-uts 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 Tarpin was killed. At last the French were driven entirely from the heights, and Souchon, in the interval of 1814, got into the town 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 3200 men.

On the 15th of March, the 11th Marshal Soult evacuated Toulouse by the only road which was still open to him, and retired to Castelnau-d'Arcay to Carcassonne. 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 to the immense joy of the patriots who came in crowds to welcome and acclaim him, the people having 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 Louis XVIII. Lord Wellington told them what he had told the people of Bourdeaux, 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 whether it meant to declare in favour of the Bourbon, in which case it would be his duty to treat as they treated 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,' xi., p. 382., note.)

The next news was the arrival of the American Colonels 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 colonels went 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 polite letter, excusing himself from accepting the 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 new empire, and to prevent Napoleon's pretended pretensions for his son. At the same time he made preparations to pursue Soult, if required. At last, on the 18th of April, Soult, having received from Berthier an order to stop all hostilities, concluded a convention with Lord Wellington for the purpose. A line of demarcation was drawn in 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 Catalunia by the French garrisons was promised.

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 English 18,000 men, in a very serious affair, including General Hay, who was killed, and the general of the guards, 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 for 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 Freytag and the Prince of Asturias for the prince of Dona Sophia. On the same day theQuartering the contest, andgot the affairs of 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, and on the 18th he issued his farewell orders to the army. ('Dispatches,' xii., p. 62.)

In May 1814 he had been created Marquis of Ducro 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 as any time commuted for the sum of 300,000L, which was ultimately increased to 400,000L. On the 23rd of June 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 representative 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, returned to Paris, 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 Prussia, who had signed a paper by which the King of Prussia, Bonaparte an outlaw, a violator of treaties, and a disturber of the peace of the world, and delivering him over to public justice. ('Dispatches,' xii., 369, 302.) At the same time they declared that they would maintain inviolate the treaty of Paris. On the 11th of April the Duke of Wellington was 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 battle of Waterloo, which was fought on June 18, 1815, 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 about 76,000 men under him, of whom 48,000 were in line, and 30,000 in reserve. The French army of the Duke of Blucher, sick, detached, &c., there remained present in the field about 37,000 British and Hanoverian. The head-quarters were fixed at Brussels. Marshal Bliicher, with the Prussian army, was stationed at about 8000 men, was on the left of the British; his head-quarters were at Namur.

During the month of May, Napoleon by great exertions collected an army of about 190,000 men, chiefly composed of veterans, on the frontiers of Flanders; and on the 11th of May the French crossed the Sambre and marched to Charleroi, the Prussian corps of General Zieten returning to Fleurus. Marshal Bliicher concentrated his army upon Sombrel, holding the villages of St. Amand and Ligny in front of his position. The Duke of Wellington concerted an attack on the 17th of May on the French at Quatre Bras, and moved towards Charleroi and 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 determination even when defeated, and gave the French 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 consequently of the Duke of Wellington, which however made no impression upon the British position.

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 Meiks Braine, and his left extended to a height above the hamlet of Ter la Haye, and he occupied the house and gardens of Hougoumont, near the Nivelles road, in front of his right centre, lying in a way between the 2nd and the 3rd corps. The French collected their army, with the exception 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 launched their attack in two columns of infantry, supported by a numerous cavalry, and by a deadly fire from his numerous artillery. His attacks were repulsed with great loss on both sides. In one of these attacks the French carried the post of Le Haye Sainte which was occupied by a detachment of Hanoverians, who, having expended all their ammunition, were cut to pieces. Napoleon then ordered his cavalry 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 he took part. The battle began at about 7 o'clock in the evening, when General Bulow's Prussian corps began to engage on the French right, Napoleon moved forwards his guard, which he had kept in reserve, to make a last desperate effort on the British left. The Duke of Wellington had already possession. The French guard marched resolutely in column, with supported arms, under a destructive fire from the British position. They halted at the distance of about fifty yards from the British line, and attempted to deploy, but they became mixed together whilst unpermitted discharges 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 irrevocable confusion. On this day the Duke of Wellington moved forward his whole line, which he led in person. The French 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 Blucher now came up with the Prussian corps, and took up position on the field, whilst the British army was in the field which they had won at such a fearful cost. The British and German Legion had on that day 2433 killed, 9928 wounded, and 1875 missing; many of the last however joined afterwards. In the general action the French lost 2433 killed, and 2380 wounded, making altogether nearly 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. After the battle the French were led back by a party of Polish lancers. Colonel de Lancey, quartermaster-general, was also killed. The Earl of Uxbridge, General Coke, General Halkett, General Barnes, General Baron Allen, the Prince of Orange, and Lieutenant-colonel Lord Fitzroy Somerset, were among 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 the Prussian army. It had been his wish to occupy the great continental army, which had lasted for twelve 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 remained on the heights of ponts de Foy, awaiting the approach of the allies, and leave for Rochefort, being deserted by the nation at large. A provisional government was formed by the legislative chambers. The British and Prussian armies marched upon Paris, meeting with little or no resistance; and on the 3rd of July a convention was agreed upon between Marshal Davout, who commanded the French army at Paris, on one side, and the Duke of Wellington and Marshal Blucher on the other, by which the French army withdrew from the capital, and retired beyond the Loire, and the allied armies occupied the capital. The treaty was restored to the throne of France, and peace was concluded between France and the Allied Powers.

After the return of the Duke of Wellington to England, the House of Commons voted a sum of 500,000l., in addition to the estate and mansion of Strathfieldsaye in Hampshire were purchased, to be held by the Duke of Wellington and his heirs on the condition of presenting a tri-coloured flag to the town of Aix in memory of what had been done in 1815. The title of Prince of Waterloo, and the King of France created him a Marshal of France and Duke of Brunoy.

Peace of 1815.—The battle of Waterloo was succeeded by the peace of Paris (September 30), which was interrupted, except by the short but terrible contest with Russia in 1854-55. To prevent any recurrence of those desolating wars which had just terminated, it was resolved by the Allied Powers that Napoleon should be detained in custody in the island of St. Helena, and that France should be controlled by an armed occupation. The Duke of Wellington was by unanimous choice placed in chief of the allied forces retained in France for this latter purpose; and it was chiefly owing to his mediation and influence with the allied sovereigns that no penalty of confiscation was enforced upon France, and that the armed occupation was limited to the coast.

In September 1818, the King of Prussia and the Emperor of Austria and Russia met at Aix-la-Chapelle, in order to hold a political congress, which was attended by the Duke of Wellington. A private conference was concluded for the evacuation of France by the allied armies, and for the restoration of that kingdom to its independent dignity among the European governments. The allied armies began to evacuate France on the 1st of November 1818. A week previously the Emperors of Austria and Russia and the King of Prussia created the Duke of Wellington a Field-Marshal of their respective armies. He returned to England early in November.

When the Duke of Wellington returned from France the military life of the Duke of Wellington may be said to have terminated. He shortly afterwards commenced that life of political and administrative activity in which he attained an influence at home and a reputation abroad greater perhaps than that which he had acquired in the field of battle. On the 1st of January, 1819, he was appointed to the office of Master-General of the Ordnance, and took his seat in the Cabinet as a member of the administration of Lord Liverpool. This was one of the most prominent parts of public affairs, he had to bear his share of the popularity which was the necessary result of the attempt of Lord Liverpool's government to put down disaffection. When Mr. Canning, on the death of Lord Liverpool on the 13th of December 1827, succeeded Lord Liverpool in the office of Foreign Secretary, he selected the Duke of Wellington to proceed to the Congress at Verona as the representative of Great Britain. On the 10th of March 1829, the Duke was appointed High Constable of the Tower of London, and in the same year was made Knight of the Garter. On the 1st of June 1828, the Duke of Wellington was created Duke of Wellington, a title which was to induce the Emperor Nicolas to join Great Britain and the other European Powers as mediators in the quarrel between Turkey and Greece. The mission was successful. On the death of the Duke of York, January 29, 1827, the Duke of Wellington succeeded to the office of Commander-in-Chief of the Forces. On the 17th of February following a stroke of apoplexy terminated the political life of the Earl of Liverpool, and early in April Mr. Canning succeeded to the office of Prime Minister. The Earl of Liverpool died on the 4th of December 1828.

On the accession of Mr. Canning to office as premier, April 10, 1827, the Duke of Wellington, who had no friendly feeling to him as a man, nor any liking for the popular principles of his administration, would not accept of any office not of his seat in the Cabinet, which was attached to his office of Master-General of the Ordnance, but also of his office of Commander-in-Chief of the Forces. The majority of the other members of the cabinet likewise resigned their offices. Mr. Canning died August 8, 1827, and was succeeded by Lord Goderich as premier. The Duke of Wellington then resumed his office of Commander-in-Chief of the Forces, but did not join the new ministry, which was of very short duration. Lord Goderich resigned, after holding the premiership for only three days.

On the 8th of January 1828, the king sent for the Duke of Wellington and offered him the premiership, which he accepted, though only eight months previously, he had said in the House of Lords that he was "sensible of being unqualified for such a post in public life, and could not think of it," words of which he was reminded at the time, as well as occasionally afterwards. He recalled Mr. Peel and Mr. Goulburn to the Cabinet, and retained five of those who had been in the last ministry, Mr. Huskisson, Lord Dudley, Mr. Goulburn, Mr. Canning, and Lord Palmerston.

The Duke of Wellington now resigned the office of Commander-in-Chief of the Forces, and appointed Lord Hill as his successor. The parliamentary session of 1828 commenced on March 11th. Lord John Russell brought forward in the Commons a motion for the repeal of the Test and Corporation Acts. The government opposed the measure, but the motion was carried.
in a full House of Commons by a majority of 44. Though the Duke did not agree of the policy of this measure, some of his colleagues did; and therefore to avoid a division 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 Wyndham and Torkington. The Duke also gave his sanction to a corn-bill introduced by Mr. Huskisson. Later in the session however, when a motion was made to disfranchise the corrupt borough of East Retford, and invest Birmingham with the electoral rights which might thence be transferred to the government, the Commons, the last in point of time, by a majority of 301 to 13, and a motion by Lord John Russell, "that it is expedient to extend the basis of the representation of the people," was also negatived by 313 to 117. There we much disgust throughout the country among the agriculturists, who for the first time in their history have been taxed on the corn, and the great body of the people, at that time, apprised to care little about the question of a reform of the House of Commons. A change, however, and that sudden and violent, was about to take place.

Resolution put on the 26th of June 1830, and was succeed 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, and a new one summoned. Algeria, immediately afterwards an important revolution took place at Paris. Charles X. was driven from his throne, and abdicated; Louis-Philippe was chosen as his successor, with the title of King of the French. The revolution spread over the British islands as well as over the continent of Europe. In Great Britain and Ireland the people, preparing for the election of new members of parliament, we everywhere seized with an ardent desire for more liberal institutions, and the press was filled with the names of the constituencies which elected 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. During the autumn which followed, Earl Grey, in the House of Lords, urged the necessity of an immediate reform of the House of Commons; and the Duke of Wellington, in reply, affirmed that "the country already possessed a legislature which answered all the good purposes of the state," and declared that "the full and entire confidence of the country," and declared that he was "not only not prepared to bring forward an immediate measure of reform," but would "resist any such a measure as long as he held any station in the government of the country. Public meetings were held throughout the country, which were attended by vast numbers. The Duke of Wellington opposed the Reform Bills steadily and frequently in opposition. Hence he became unpopular, and the bitterness of the feeling—at least of lower orders—may be inferred from the fact, that when returned from a visit to the Tower, June 18, 1832, he was met by a hostile crowd of 15,000, who jeered and insulted him. The windows of Apeley House were 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 25, 1834, and on the 29th of the same month the Duke of Wellington was unanimously elected to succeed him. To this period we may consider the commencement of the great French revolution, the revival of the Catholic question, the depression of trade, and the feeling was the prevailing one, which was the subject of conversation. The political party leaders were Masters, and was attended by a vast concourse of persons.

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 result of his elevation had the effect of rousing public sentiments, which were long placid, and the result of the general election was less disastrous than had been expected. Queen Victoria, and let
Melbourne retained the office of premier till August 30, 1841, when he resigned, and Sir Robert Peel again became prime minister. He chose as his Duke of Wellington to replace him in the Cabinet, but without taking office. After the death of Lord Hill, December 10, 1848, the Duke of Wellington succeeded him as Commander-in-Chief of the Forces, and continued uninterrupted to perform the duties of that office till the termination of his life. The Duke's last political difficulty occurred in 1846, when the repeal of the Corn-Laws had become a necessity. Sir Robert Peel saw the necessity: he knew that there would be a large majority in the Commons, but success in the Lords depended on the influence of the Whig party. The duke acted on his own responsibility, and 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 action, and took the line of difficulty that he had held to the Queen and the Commons, and by his influence and his prolixity passed the measure through the House of Lords, May 26, 1846, by a majority of 47.

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 n 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 of action was, to take the line of difficulty, and to have the 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 severity of decision 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 the change of general policy or of his opinion, or gave the House of Lords, and spoke frequently. His influence over the members of that House was such as probably never possessed by any other individual. As a public speaker, his delivery, without being fluent or rapid, was precise, his enunciation firm and clear, his voice round and melodious. He was temperate in the use of food and wine, slept on a hair-mattress on a simple camp-bedstead, was an early riser, and was ind-fatigable in his attention to business. He seldom made use of a carriage, and continued to ride on horseback when from the infirmities of age he could no longer sit erect, and he also used the exercise of walking even to the last, though his steps were slow and altering.

Weigel and Henrik Arnold, a very distinguished Norwegian poet and political writer, was born on the 17th of June 1806 at Christiania, where his father, Vikland, a clergyman, was one of the assistant masters at the Latin school. The father, who was much expected, was employed in collecting the materials of his history, and newspapers, has also had that of adding notes, which on some occasions were 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 by Henrik Arnold's poetical works, 'Jan Van Huysum's 'Flower-Piece' and 'The Spaniards' are considered by far the best. One volume is filled with the fables: two others with dramatic poems. An early tragedy, entitled 'Sinclair's Death,' is founded on a well-known incident in the north of Scotland.

Ah!' It was afterwards followed by twelve other fables of a similar kind, some in verse and some in prose, and mostly full of moral lessons, all written in his last opinions and a reasoning of personalities. It was not surprising that these productions should arouse the animosity of the parties to whom they referred, and for the ten years from 1827 to 1837 Wergeland's life was passed in what is familiarly called 'hot water.' His controversies in the newspapers, some of which he occasionally edited, were 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 Dr. R. G. Lecky has observed, 'Norway and the Norwegians' gives an interesting account of a visit to the correspondents of Europe, and that he might be called an 'Elliott Dando.' His political feelings were intensely felt, and his opinions on Norway and the Norwegians, 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 within, but in 1839 the appearance of an attack upon him by Welhaven, another rising poet and critic, 'Henrik Wergeland's Digtekunst og Polemik' (Henry Wergeland's Poetry and Polemics)—began to turn the current, though Wergeland's father wrote vigorously in his defence, and it may be that the present high opinion of Norway is in favour of the united action of the three Scandinavian countries. It was regarded however as a great triumph of Wergeland's views that in 1837, Sweden conceded the point of allowing a separate national flag to Norway. In 1838, the year before his death (October 17), Wergeland (Slette) paid a visit to Christiania, and Wergeland wrote a complimentary poem on the occasion, which was said to have been received by the sovereign with peculiar gratification. The Norwegian public was surprised to hear afterwards that the king and queen were not satisfied that the visit and the payment of the respects due to him would not have been better shown in a visit to Christiania. Wergeland, who was, with the exception of the king, generally regarded as the chief 'radical' of Norway, an annual pension from his own private purse, and a storm of indignation burst on the head of the poet. His position up to that time had been somewhat precarious one. So far as the literary public was concerned, he had been dismissed from his editorial situation after passing in 1839 an examination as candidate in theology, and officiating for some time as curate to his father. A poem which he had published, under the title of 'Creation, Man, and the Hebrews,' he published the same year as his father's poem, 'Creation, Man, and the Hebrews,' was similar in its style to his best work, and which many even of his admirers declared themselves unable either to admire or comprehend, contained views and opinions which were not considered compatible with the position of a minister of the church; and as a reward of his life's work, he was placed against him. On quitting theology he studied medicine; in 1836 he was appointed keeper of the university library, and in 1840 keeper of the Norwegian archives. Giving up political writing after his pension, he devoted himself to poetry; and though his reputation abroad was perhaps on the wane, the enthusiastic reception his predecessors had enjoyed, it is now acknowledged that they are the best of his whole career. In 1840 he married, and was enthusiastically attached to his wife. But his constitution, originally athletic and corresponding with his stature of six feet three, was irrecoverably shattered by an immoderate indulgence in brandy, and he died on the 12th of August 1845, at the age of thirty-seven.

A collected edition of the principal works of Wergeland was commenced in 1851 by the Student's Society of Christians, 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 the whole works of the poet, and of including all his verse, was also responsible for the publication of the Wergeland's 'The Campbells,' and two tragedies, 'The Child-Murderess' 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 Webergeland's prose writings the most interesting article with some short biographies of distinguished Norwegians, and a history of the formation of the constitution of Eidsvold.

WERNERITE. [SOAPOLITE]

WESTALL, WILLIAM, A.R.A., younger brother of Edward Augustus Westall of Hertford. October 19, 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 Lysithea, as his companion during his many voyages. 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. The ship which did not get back to England was bound to China, and he remained some months in that country, when he secured a passage to India. Here he also remained some time, making a journey into the interior and occupying himself, as elsewhere, which proved destructive of all grander objects. Not finding, on his return to England, employment as readily as he anticipated, he made a voyage to Madeira and the West Indies; and on his return opened, in 1806, an exhibition of the large collection of water-colours which he had made during his travels in various countries he had visited: it proved however an unsuccessful speculation. Captain Flinders returned to England in 1810, and Westall was directed by the government to prepare his sketches for engraving to illustrate the account of the voyages. The work was completed, and the engravings were rendered 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 was not subjected to the same treatment as his brother, and he was not in the public eye. His contributions to 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 22, 1850.

WESTERN AUSTRALIA. A, in the north of the continent, extends about one-fourth of the whole continent, and comprehends all the countries lying west of 132° 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 joined, coincides with the line of the Swan River. And so near the coast of the Western Sea near the Australian Bight, at Cape Adien. Thus Western Australia contains about one-fourth of the whole continent, and lies between 30° and 14° S. lat., 115° and 133° E. long. The limits of the British colony, on land, which is included in the name of the 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° 8' S. lat., 115° and 119° E. long., or about 400 miles from south to north, and about 200 miles from east to west.

Coast. — 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 surveyed. Tasman Land, between Point Gantheumne and Cambridge Bay, to the northward, has a coast more broken than any other part of Australia, and indented with wide bays, and some narrow inlets, which penetrate a considerable distance into the interior. The coast of Tasman Land has been but imperfectly explored, 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, the most important is Port Bockingham in Cockburn Sound, Albany in King George's Sound, Banbury in Port Leschenhaut, 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 from the sea, in is the port. This port forms the colony of Western Australia. The entrance is encumbered and rendered dangerous by several rocks. A lighthouse is placed on Rottenest Island at the entrance, and on some of the more dangerous islets. The coast extends for 131 English miles, and is about 23 English miles in width, or 40,000 acres. The whole coast is broken by numerous bays and inlets, and the land rises gradually from the sea, and is level on the coast, and high land is distant about three miles.

Mountains, &c. — A range called the Darling Mountains extends along nearly the whole length of the colony. Its distance from the coast varies from 50 to 150 miles, and its height is from 900 to 3000 feet. It is generally sterile; the stones which form the surface are coarse, and a coarse herbage appears on the surface, and plants which resemble 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, etc., and in the environs of the town iron-ore, magnetic iron-ore, chromate 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 from Boddington in Cockburn Sound, Albany in King George's Sound, Banbury in Port Leschenhaut, and Augusta, near Cape Leeuwin, in about 34° 30' S. lat.; Cape Leeuwin, in about 34° 30' 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 at the mouth of the Grafton River, about 35° 27' S. lat. The highest point is Talbanong, which is stated to attain 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 thickly settled district of the colony, it is sandy, while in some form or other, it is of a very inferior description, except where the rivers have brought down an alluvial deposit.

Rivers. — The rivers on the west coast of Australia generally rise at no great distance from the sea. Near their sources they are traced by streams, and are slow and meandering. 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 Canong, the Harvey, the Preston, the Collie, the Vasse, the Blackburn, and the Moore. The Murray, the Collie, and the Avon 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 a 8 miles. The Murray, the Collie, and the Avon enters in the Darling Range, and empties itself into Peel's inlet. The Preston and the Collie unite about 50 miles south of the Murray, and the united stream runs into an estuary called Leschenault, and forms a bar, over which 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.], but is superior in health, while in the case of some persons it has proved highly favourable. Though variable, the western part of this colony
is not so uncertain as New South Wales in the supply of rain and moisture. The average winter temperature is about 58°, that of the summer about 76°.

The wet season begins generally in March and ends in November, when the rain being most abundant in August and September. The height of the dry season is during the harvest, in January, when the nights are distinguished by heavy dew. The seed-time lasts from early in May to the end of August. By December the grain is ripe: hay is cut in March. The cereals are cultivated on the flat; barley, oats, rye, flax, clover, field peas, and several others are grown. Cuttings produce fruit the first year, and vines the second or third.

Population.—The aborigines do not amount to more than 170,000. The European population now amounts to 270,000.

In 1852 it amounted to 6711, including 705 enumerated among the military, 1433 bond, and 6674 free. According to an official return, Dec. 31, 1865, the European population was 12,515, of whom 8536 were males, and 4979 females. They are distributed as follows: 12,515 of whom 8536 were males, and 4979 females.

The convicts and their families, and the officers of the colony are divided into government purposes into 32 counties. On the first establishment of the colony in 1828, it was decided that no convicts should be sent thither, and a system of colonisation was projected, to be carried forward under the supervision of the Wesleyan Methodists, in which they did well. The labourers sent out became landowners, and hired labour became excessively dear. Convict labour has since been requested by the colonists, and has succeeded well; but it prevents free emigration to a considerable extent, for as the convicts are employed on agricultural work, the demand for free labour is not large nor constant. The assisted emigration in 1855 was only 93, and the landsales in 1856 only amounted to 1779 acres. The public works had been executed under the superintendence of the Royal Engineers, and consisted of the permanent prison at Fremantle; commissariat stores and offices at Fremantle, Guildford, York, Toodyay, and Bunbury; jails at York, Toodyay, and Bunbury; 272 miles of road made; 38 bridges built, one of which, over the Swan at Guildford, is 480 feet long, and another 250 feet long, built at Fremantle as a landing from the river, and another 455 feet long, as a landing from the harbour; the lakes at the back of Perth drained, and the swamps in Fremantle filled, and the supplies we had on hand were all used. The convicts had on the whole been good, and considerable improvement had been developed in their characters.

Commerce.—Though most of the English grains are grown, and the soil is tolerably productive, the exertions of the settlers are chiefly directed to the raising of stock. Wool is one of the chief articles of export; horses, which are sold to supply the cavalry at Madras, are another large article of export; as is sandal-wood, and a species of mahogany, of which there are large forests in the interior. Guano has been found in considerable quantities in the bay of Shark's Bay. Attempts have been made to prosecute the whale fishery; and something is being done in fishing off the coasts to furnish provisions for the inhabitants. There are many salt-lakes and springs, and a considerable quantity of salt is manufactured.

Dredging.—At Prevelly Point the choice of the course of navigation is made, and from this point the tide belongs to the right side of the estuary of the Swan River, near its junction with the Canning. The population is small. The town is however improving, but the houses are scattered over a large area. A bridge is now being built over the estuary of the Swan River, and there is a new jail. Fremantle is on the opposite side of the Swan River estuary, a few miles lower down. It is the seat of the convict establishment, and there is a jail. A lighthouse has been erected upon Arthur's Head, a promontory in the vicinity of Fremantle, and another from the harbour. Albany is a port-town in the south-eastern part of the colony, in King George's Sound.

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 still retains the name. The harbour of Port Levenham, upon which it stands, is a good and large one, but it has little commerce. Geraldton is an inland town on theMurdoch River, founded in consequence of the commencement of the working of lead-mines there by a company. Guildford is a small town, on the Swan, and is the seat of a college. Northam is a small inland town, in an agricultural district, east of the Darling Range, on the river Mortlock, and is about 80 miles in a direct line E.N.E. from Perth. Rockingham is on Cockburn Sound, and has a good port, and some trade. The town of Swanport is on the Swan River, about 64 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洌 Computers Bay, about 30 miles S.S.W. from Bunbury, about 56 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, Cervantes.

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. In 1793 he was apprenticed to 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 1795 the medal given by the pope. He was elected a member of the Royal Academy of Florence in 1795, and after 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 images of the Empress Josephine were unusually graceful, chaste, and poetic character, classic in feeling, 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 of his works are: 'Fanny,' executed for the Duke of Bedford, and now, with a companion 'Cupid,' at Woburn. Among the best known of his other poetic works are the 'Hyppocrite,' executed for the Duke of Newcastle; an exquisite figure of 'A Nymph unclasping her Vest,' the property of the Earl of Carlisle; 'The Distressed Mother,' executed for the Marquis of Lansdowne; 'The Homeless Wanderer;' 'Devotion,' &c. He also executed several important works in alto and bas-relief; one of the first of which was probably his portrait of the friars in the Manresa Convent, near Barcelona, and of other portraits 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 alto-relief in marble in the east end of St. Paul's Cathedral. He was born at Petworth. A large portion 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 (1809), which, with his monuments of the Duke de Montempsier, and Mrs. Warren, and her Child, are in Westminster Abbey; 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 Buckingham-square; Flaxman in the garden of Bethnal Green, and Flaxman and Baily 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 executed it is uncertain. His taste, or that of the women of England, we do not know.

Westmacott was elected A.R.A. in 1805, and R.A. in 1816. In 1837 he succeeded Flaxman as Professor of Sculpture. He died at 61, on the 21st June 1856, and was interred at Westminster Abbey.

Webley's [Whale's].

WHEATON, HENRY, an eminent American diplomatist.

65.
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. Seely, and was admitted to the bar. He then passed a couple of years in Paris and London, during which he acquired considerable acquaintance with civil law, 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.' He continued in this capacity for three years with merited success. He contributed to it, among other things, a series of disquisitions on the law of nations. In 1815 he was appointed one of the justices of the Marine Court, and the same year he published a 'Diges of the Laws of Nations.' For these and other learned speculations. He was appointed in 1821 a member of the committee for revising the constitution of New York; and in 1825, a commissioner for revising the laws of that state. He resigned his offices, however, in 1831, and thereafter devoted himself to his profession. He was appointed in 1801 a member of the commission for revising the constitution of New York; and in 1825, a commissioner for revising the laws of that state. He resigned his offices, however, in 1831, and thereafter devoted himself to his profession. He was appointed in 1801 a member of the commission for revising the constitution of New York; and in 1825, a commissioner for revising the laws of that state. He resigned his offices, however, in 1831, and thereafter devoted himself to his profession.

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. The laws of the Wife. In all countries the wife is compelled to protect her earnings from him or his creditors, and she will then be able to contract as if she were a feme 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, the wife may obtain a judicial separation. (Separation, § 2.) When the husband 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 marriage is dissolved by the Act 39 & 40 Vict. c. 85, § 121. The Act 30 & 31 Vict. c. 85, which has effected 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 Woburn, in the county of Middlesex, 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 1816 he published a 'Geographical Primer,' for the use of country schools; and in 1818-19 he contributed some poetical effusions of considerable merit to a volume entitled 'Poems by Three Friends.' He next wrote some spirited stanzas on the portraits in Woburn Abbey, inserted in the Rev. Mr. Parry's 'History of Woburn,' and several other pieces of the same kind. In 1819 he published 'Aonian Hours,' and other poems, which attracted the notice of the Duke of Bedford, who appointed him his librarian at Woburn, and his private secretary. From this time he lived in the enjoyment of literary leisure, but continued to employ himself actively. In 1890 he published 'Julia Alpinus, the Captive of Stamboul, and other Poems;' in 1892, a translation of the poems of Garciilaso de la Vega; and for many years he contributed original poems and translations to 'Time's Telescope,' and various other periodical works. Among the original pieces may be mentioned 'The Luck of Eden Hall,' as a successful effort in the old ballad style. In 1830 he published a translation of Tasso's 'Jerusalem Delivered,' on which he had been working for several years. About the same time he wrote a Spensian stanza, and the versification is free and flowing, but as a whole it is certainly not calculated to supersede the bold and vigorous translation by Fairfax. In 1833 he published in one 8vo volume 'Historical Memoirs of the Ancient Constitution of the British Empire, and of the decayed, and we were ready to offer a prize for a treatise on the subject;' it was published at Leipsig in 1841, under the title of 'Histoire du Progres du Droit des gens en Europe depuis la Paix de Westphalie jusqu'au Congres de Vienne, avec un precis des Operations des Institutions de juridiction des gens en Europe depuis la Paix de Westphalie.' The author afterwards remodelled the work, and published it in English in one thick volume (New York, 1845), under the title of 'History of the Law of Nations in Europe and America from the Earliest Times to the Treaty of Washington.' In the latter part of the same year he published a second part of the work. Mr. Wheaton continued after his return to America to pursue his usual studies. He had even accepted the offer of the chair of International Law in Harvard University, and was preparing to enter upon its duties, when he was suddenly cut off on the 11th of March 1848. Since his death there has been published a fourth edition of the 'Elements of International Law.' By the late Hon. Henry Wheaton, LL.D. Revised, annotated, and brought down to the present time, with a Biographical Notice of Mr. Wheaton, and an account of the Divers Transactions in which he was concerned. By Hon. William Beach Lawrence, formerly Chargé d'Affaires at London.'
though with pardonable partiality. He latterly studied Hebrew and Welsh, from the last-named of which he made himself successful poetical translations. Mr. Willems main-
tained his connection with the Society of R. M., his officers of trust in it occasionally, until his death, which took place suddenly on May 3, 1866, at Woburn Abbey.

WILL AND TESTAMENT. The "Wills Act."—Viet. c. 8. was passed in 1567. It was more in the nature of a code. Simple apparently as are the requirements of the first statute, an immense number of questions had arisen upon the lan-
guage of its provisions; and probate had over and over again been refused to wills, the authenticity of which was beyond doubt, and which were, in fact, quite in accordance with the specimen of legislation; as the simple perusal of it will show, that it is passed not to amend the law, but to provide against the consequences which have been held to follow from the negleci gence of testators, in not paying strict attention to that aspect of the Wills Act, which requires the instrument to be signed at the "foot or end."

WILLES, JAN 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 Bouchout, a village near Antwerp, on the 11th of March 1756. The French sans-culotte army, under Dumouriers, was at that very time advancing to the siege of Antwerp; a party of his soldiers entered Bouchout on the night that Willems was born, and a certain politely-witted youth from his father's house, observing that the first French citzen of the district would be the first French citizen of the district, and little foreseeing how effective an opponent he would prove to the influence of French in Flanders. The attachment of Willems to the Flemish language, and his hatred of French, and of Frenchmen, where he was sent from the age of twelve to fifteen, to learn singing 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 education, and in the habit of getting up theatrical entertainments. "The Cecilian Society of the principal church, St. Gummars, where I every day sang or played the organ, being," says Willems, in a history which he after-

In 1770 he became 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 found a position with the auditors of the Bank, and contended victoriously against twenty-six competitors for the post 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 Rise and Rise of Joseph," and "The Return of Lot," were produced with success both on the stage and in print. 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, and the Dutch, were only very slightly differing dialects of one common 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, rehorted his countrymen not to continue to abandon the language of their fathers, which was also the language of Vondel and Bildersdyk. This poem, which produced a strong sensation, was accompanied by a French translation, which it may be reckoned was as faithful as the original. It formed the basis of some of Willems's "Discourses on Flemish Language and Literature in connection with the Southern Provinces of the Netherlands" ("Verhandeling over de Neder-
dytsche Taal- en Letterkunde opgeteekt by Zugdeleyk Pro-
blems," Groningen, 1816), which appeared in 1816 and completed in 1824. In this work, which extends to two octavo volumes, he 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 early, as the national language was cultivated, but 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 part, while the use of the native dialect, or of 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 attempted to prove that Willems's work could not contribute to the safety of the country, and another from the Vestey Protestants North to the Catholic South. The dissertation 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 th- researches of other men of letters has somewhat lessened the value of rendering it in some degree obsolete. From the time 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 Weyere in a French pamphlet, an anti-liberal literature, in 1824. Willems died on May 18, 1839, 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 fortunes of its champion. Willems had been 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 the archives, and had also, in conjunction with Van de Weyere, one of the first commissions and established the archives and monuments 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 provinces of Limburg and Luxembourg, which 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 Weyere, aroused the government to a sense of its unworthy treatment, and in 1833 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 into Dutch. His passions were still maintained, and 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 1800 francs, and is now preserved under his editorship with a preface, in which he maintained his views with great ability. From this time his life flowed in a course of literary labours and honours. A society was formed at Ghent "for the encouragement of the Low-Dutch language and literature," and in 1835 Willems was elected its president, under the editorship of Willems, which was so entirely his work, that at his death it suddenly ceased, and was brought to a close, with, for its last article, the life of Willems, from which this notice has been chiefly based, a Scotch translation of some of the most interesting matter. The cultivation of the Flemish lan-
guage, 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 ‘Tasverbond,’ 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 dismissal for his endeavours, and had already in 1826, been knighted a name of the order of Leopold. The Flemish movement still appears to make progress, and the meetings which have been held of distinguished literary men of both the North and South Netherlands appear likely to result in plausible hopes. Willems’ opinion in Painting in Flanders than it has been for centuries. Willems however was not destined to witness this triumph. He died at Ghent on the 28th of June 1846, after a very brief illness, of an apoplexy.

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 that have not been already mentioned are his ‘Mengelingen van vaderlandschen Inhoud’ (Miscellanea on National Subjects), Antwerp, 1827-30; the ‘Rhymed Chronicle of Jan van Heeul;’ the ‘Rhymed 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 of Paris, by Jan de Klerk,’ and first published by Willems at Ghent in 1840.

WILLIAM II. (FREDERICK GEORGE LOUIS), King of the Netherlands and Grand Duke of Luxembourg, was born on December 6, 1792, and under the care of his father, was soon learning military subjects, and 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 was in the battle of Talavera, his rank of lieutenant in the Spanish service. His courage and activity procured him the esteem of the Duke of Wellington, who made him aide-de-camp. At the siege of Ciudad Rodrigo he was among the foremost in the storming party, and at that of Badajoz he entered the city carrying the English colours, which he re-entrained as he had checked. He also distinguished himself at the battle of Salamanca, and on other occasions, for which he was promoted to be aide-de-camp to the king of Great Britain. When in 1814 his father was restored to his kingdom, the Belgians required him, also as a reward for the victories he had won. 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 return he attended the Congress in Paris, and here was made the proposal of his union with the Princess Charlotte of England, which however failed, because, it is said, the prince was unwilling to become an English subject only, even if the first; and because the marriage was refused by the authorities of the emperor of Russia. On the breaking out of the revolution in Belgium in 1830, he repaired first to Antwerp and then to Brussels, where his appearance made a great impression. But his endeavours at a reconciliation failed, and the revolution was brought to a successful issue. On October 16 he recognised the independence of Belgium, for which his father immediately cashiered him, and he withdrew to England, whither he brought his two eldest sons to be educated.

In the following year however 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 occupation in Flanders. His father, on October 7, 1840, he succeeded to 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 revolution in Cambridge in 1848, he was forced to consent to extensive changes, which probably might have been avoided by smaller concessions made earlier. He did not however live long to witness the effect of the alternations, as he died on March 17, 1849.

WILLIAMS, EDWARD, a painter, was born at Kidderminster, Worcestershire, on 2nd September 1756. He received his first instructions in drawing and painting, he was at the usual age apprenticed to a printer 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 employment with the lower order of grown men in the trade, and gradually rising in station and position, became one of the leading artists in the line of wood-engravers, and at the same time one of the best designers and wood-engravers of his time. His earlier engravings executed for Whittingham’s Novélies et Poésies, for Willemen’s ‘Tasso,’ and the architectural illustrations in Magasin des arts, Galeries de la Reine, display qualities strikingly apparent in his vigorous, characteristic, and original, though occasionally somewhat rude design. His later engravings for Hone’s ‘Every Day Book,’ in his later engravings and designs—as those in Howitt’s ‘Rural Life,’ Scraps’ ‘Days of Salmon-Fishing,’ and Deer Foraging’—showed ‘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. Throughout life he retained his early ambition of painting in oil, but we are not aware that he executed any works of conse 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.

WILLIAMS, EDWARD, a PESSOR, was born on the 19th of May 1758, at Paisley in Scotland, where 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 Procter and Chadwick. He was educated at a school in the village of Kilbarchan, and was married Sir John Macneil. At an early age, the future poet 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 natural history. At nineteen 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 off, among other honours, the Newdegate’s fellowship in 1806, for an essay upon ‘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, wrestler, and archer in the University. He graduated B.A. in 1807, and in 1810 he obtained 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 married in 1811, Miss Scott, the daughter of a double character by purchasing, or having purchased for him by his father, the small, but beautiful estate of Elleray on Lake Windermere, where as Hercules, he might yachting about at his pleasure, beat the best boating at the ear, and wrestle with the best in the wrestling-match. But the chief charm of Elleray is that there in the quiet beauties of the finest of English scenery, indulge 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 Dr. Unish, the last of whom describes the extraordinary manliness of his character at this time, dazed with an eccentricity which showed itself in all kinds of freaks and projects—and among them that of becoming a fisherman. “Fishing was his real vocation (1810) that he married an English lady of wealth whom he met where she was on a visit to the Lakes with her family, and falling in love with her at first sight, wooed and won with romantic rapidity. He had by this time published some anonymous poetry, and in 1812 he published a volume of Miss Scott to Miss Joanna Baille and will show the impression which he had begun to make in Edinburgh: “The author of the Elegy upon poor Graham is John Wilson, a young man of very great and numerous poetic powers. He is now engaged on a poem called ‘The Life of Falstaff,’ and another in verse by Southey. He is an eccentric genius and has fixed himself on the banks of Windermere, but occasionally resides in Edin-
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 1818, and gave Wilson a place among the Lake Poets. In 1813 he was called to the Scottish bar; at which he however 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. 'He was a better writer,' says Mr. Purdon, "than to attach himself to the little band of young Tories, with Scott as a cautious veteran to advise them, who were disposed to break out in rebellion against Jeffrey's Whig supremacy in the northern world of letters; and, accordingly, when Blackmore failed, he rose in 1824 and 1826, and in a native Scottish Toryism similar to that which had been already provided in the 'Quarterly Review' for British Toryism in general, Wilson was one of the first to join him. He had lost his high opinion of Burke, as one of those statesmen—so says by the publication (1816) of a poem of some length, entitled '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 hair flung over his ears, even pausing to look at the passers by, were turned to look at him; and his reputation in social circles was that of a young Goth of genius with powers undeveloped, which would one day astonish Britain." At first Wilson was associated with Lockhart and others in writing for 'Blackwood's,' as that it to not till 1834 or 1836, that that publication was identified with him to the full extent.

The connection with Blackwood was an important event in the life of Wilson; and it was speedily followed (1830) by his departure to Dollar, and thence to the University of Edinburgh, then vacant by the death of Dr. Thomas Brown. The appointment was made rather on the grounds of Wilson's political opinions and his promising genius than on the evidence of any special literary proficiency. His first published work was the edition of Sir William 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 the former would not be disappointed, 'for the consistency 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 obliged him to leave Edinburgh), gave him the necessary opportunities. He had, at all events, the good effect of determining Wilson's genius permanently to prose rather than to verse. 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, "that in verse he would ever have been more than one of the minor Lake poets. It was in prose, and more especially as a poet in prose, that his genius was to display itself in its full capacity; and both the magazine and the lecture room gave him the necessary opportunities. Some of these tales, with others written independently, formed collectively his first professor prose-work, published, in 1822, under the title called "The Union of the Real Life,' and followed in 1823 by a one-volume novel 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 of the highest literary quality; and his attacks on the criticisms, in which he advanced and expounded canonaries 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 philosophical disquisitions, not very connected or systematic perhaps, but gleaming with brilliant ideas, and tinged throughout with that rich and highly-coloured mode of metaphysics which Coleridge was diffusing through England. Lastly, careless of the formality commonly attached to 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 untrammelled human being, a bruiser at country-fairs, a sportman on Scottish hills and rivers, a boon companion among bacchanals, commenting on men and manners, on life and literature, from the point of view of an inspired king of the gypsies or from amid the uproarious conditions of a city orgy. Among these papers of riotous phantasy, the most famous were the series called the 'Noces Ambrosianes,' a sort of imitation of the splendid "De Sancta Union," as well as Wilson, was a contributor to Blackwood, but which, taken up in 1826 by Wilson for himself, after Lockhart's departure for London, were continued by him till 1836, when the death of the Ettrick Shepherd, their principal contributor, finally ended the series. Several of these 'Noces' that carried the name of 'Christoper North' over the world as the pseudonym of Wilson. They were followed by a series called 'Dies Boreales,' which extended to nineteen volumes and went through five editions.

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 many papers in 'Blackwood'; in '1842 he wrote a tragedy, under the title of 'The Letters of Christopher North,' a selection of his 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 backs of the seminar rooms. He lived 'till the very last among his friends; but no more in his usual high-rang at the end of every eloquent period; but on the whole, the best of his career was over. Latterly, too, ill-health reduced his once abundant vigour. He continued in the discharge of his professional duties till 1852-3, when he was created a baronet. In 1857 a baronetcy with a year had been granted 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 following year his nephew, Professor Ferrier, who was also his stepson, became a member of the University of Edinburgh's council. Twelve volumes have appeared, including the 'Noces Ambrosianes,' the 'Essay on Burns,' which was published separately long ago ; the 'Tales'; and the Poems. The series of volumes will be continued by Mr. Wilson, who will write a biography of their distinguished relative.

WILSON, GENERAL SIR ROBERT THOMAS, the son of Sir Benjamin Wilson, a painter in Bloomsbury, was born in 1777. Having been educated at Westminster and Lincoln's Inn, he was commissioned an ensign in the 3rd Dragoons; by a daring act he saved the Emperor of Germany from being taken prisoner at Villers en Conche. He subsequently served in Ireland during the rebellion of 1798, and also in Holland, and in 1802 succeeded to a majority in Hoopsech's Mounted Rifles. He also for a time held a military command in the South West District. Having served for a short time in the Brazil and at the Cape of Good Hope, he was sent on a secret mission to the Continent under Lord Hutchinson. In 1808 he superintended the embarkation of a regiment of Portuguese refugees, and raised and formed the Lusitanian Legion. He afterwards commanded a Spanish Brigade under Sir Arthur Wellesley, and in the battle of the Pyrenees, in 1814 he was British military correspondent at the headquarters of the allied armies, and for some time held command of the Prussian reserve; at the head of this force he drove back the French to Lützen. He incurred the disfavour of his sovereign through the escape of Count Cunaulte, who had been condemned to death as an accomplice of Napoleon. A narrative of this adventure may be found in the "Gentleman's Magazine," vol. 69, part 1. p. 636. On the funeral of Queen Caroline he expressed his disapprobation of the court, and its connection with the government with respect to that unfortunate lady, and in consequence was dismissed from the army and deprived of the many foreign orders which he had won by his gallantry. He sat as member for Southwark, in the Liberal interest, from 1818 till 1831, when he retired in favour of Mr.
Brougham. Having been restored to his rank in the army, he became a general in 1841, and held the post of governor and commandant of Gibraltar till 1849. He died suddenly in 1850, soon after his return to England, May the 9th, 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, printed in 1819, 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 Policy of Russia.' A work which was severely criticised at the time of its appearance in the 'Quarterly Review.'

Sir R. Wilson replied in an animated pamphlet.

WINT, PETER DE, was born at Stone, in Staffordshire, in 1764. He was apprenticed to Raphael Smith, the mezzotinto engraver, and had for a fellow pupil Philip Lutken, the Academisian, 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 moors of Westmoreland, in the Vale of York; oats the Thames, the Wye, and other rivers; corn-fields, hayfields, water-mills, and the like, being special favourites with his pencil. His style was broad, bold, and vigorous, his colour treach; and in general effect his pictures represent an unadulterated interpretation of the naked scenery. 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 mannerism, very agreeable and effective. Avoiding all the meanness of the small master, he was full of grandeur and vigour, and his pupils and contemporaries for producing force and brilliancy, he to the last continued to paint according to the method of the founders of the English school with washes of transparent colours only; but, as he was in power and position, he, to some extent, made up in clearness and freshness. He died on the 30th of June, 1849, in his sixty-sixth year.

WITCH-ELM, or WYCH-ELM. [ULMUS.]

WOHLERITE. [MINDALAITE, S. 1.]

WOODRUFF. [ABERULA, S. 2.]

WOODSTOCK. [CANADA, S. 2.]

WORDSWORTH, REV. CHRISTOPHER, D.D., was born July 6, 1774, at Cockermouth, Cumberland. He was the second son of John Wordsworth, attorney-at-law, and was educated at John Wordsworth, attorney-at-law, and law-agent to Sir James Lowther, afterwards Earl of Lonsdale, by Anne, only daughter of William Cookson, a mercer at Penrith. The Wordsworths came originally from Peniston, in Yorkshire, and built, in 1620, the House in which Wordsworth was born. He and the name of Wordsworth's maternal grandmother was Crackanthorpe, of the Crackanthorpe's of Westmoreland. The poet was therefore by pedigree a thorough North-of-England man. He had three brothers—Richard, who was the master of the Grammar School at Kendal, and was succeeded in 1816; John, who was nearly three years his junior, and who became commander in the navy, and perished by shipwreck off Wymouth in 1805; and Christopher, the poet's brother. He married Anne Coventry, daughter of John. He had also a sister, Dorothy, born between William and John. The mother of the family died in 1778, when the poet was only eight years old; the father died in 1783, when the poet was but thirteen.

About the time of his mother's death, Wordsworth's early life was spent partly 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 Haweshead, in Lancaster, whither his two younger brothers followed him. He did 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,' 'Olive Gray,' and any part of Swift that I liked; 'Gulliver's Travels' and the 'Life of Sir Roger de Coverley.' When I was about both in his father's house, in the time of his father, 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 in the school were not great. On 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 5000l. owing to his estate by Lord Lonsdale; a considerable part of which was secured in a lawsuit with a view to recover this; but enough remained, when scraped 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 College, Cambridge, which he entered as a student, till January, 1791, 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 till perhaps, the timid courses of a dental student, who has been educated To see the river flow with ample range and flowless pace"

and, in particular, he was repelled by the mechanical manner in which recitations 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 look on himself as a natural poet. He was ambitious 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 pedes-
trian one through France and Switzerland, at the very time when the revolution was beginning in France. In 1791, after taking his degree, he spent some time in Lon-
don, 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 partly as a member of the French National Assembly. The king was dethroned when I was at Blois: and the mas-
sacres of September took place when I was at Orleans." Worsdworth was no mere indifferent spectator of the scenes of the Revolution. At this time of his life he was a vehem-
ent republican and an ardent partisan of revolutionary 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 leaving England and joining a naturalized party, involving himself, heart and soul, into the struggle for liberty—believing 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 informed by London theatre notices, and by letters which he had written, from his power. Had he carried out his intention, the probability, as he himself says, is that he would have been one of Robes-
pierre's victims, and have died on the scaffold with some of his Girondist friends. Circumstances however fortunately obliged him to remain in the island, and to return to England in 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 the political passions and distrusts which had engendered in an unjust enterprise. Much of the influence of this time, though greatly modified, remained with Words-
worth throughout his life.

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liar 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 them in a series of precursors or pre-expositions and dissertations. He believed, with Coleridge, that the period 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 the lyrical and descriptive poet was too frequently passionate and affective 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, as writing to Wordsworth, takes its origin from emotion re-collected 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 use a nervous and a tense; and, as, also, very few of the former, except 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 this principle, and that is, the nature of his business, 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 poetic representation; and with these in accordance with this negative rule, any description of a moving occurrence, whether in prose or verse, would be true poetry. But to secure still more perfectly their great end of giving pleasure, while they excite emotion, poets use the natural and as little affected as possible, 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 lying artificial diction 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, the so-called poetic diction, in which words were distrusted 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 reply was not a very simple, or neglected or severely criticised. In the interest of his views 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 manly and thoughtful class in society; but the critical disapprobation of what he had already published, partly of the appearance of other poets, thrown out at intervals from his retreat among the Lakes, each making a national sensation and some revealing the poet's voice, gave occasion to many of Wordsworth's friends and admirers to harass most on 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—his last tour in 1814, of a more continental tour in 1830, a tour in Holland and Belgium in 1832, in North Wales in 1834, on the Rhine in 1838, in Ireland in 1839, in Scotland again in 1833, in Italy in 1837, &c. Before his removal to Rydal Mount, his children Catharine and Dorothy Wordsworth were the two girls who were his inanimate. 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 directorship of stamps for the county of Westmoreland, a post which, with light duties and the advantage of permitting him to pass a great deal of time in the main in the enjoyment of his affections, afforded him abundant health. In 1814 he published a new and great poem of 'The Excursion.' It had little commercial success and drew down the criticisms upon him more than before, including Jeffrey's famous verdict "this will never do, it will never do, it is worse than before."

In 1816 it seemed as if his great enterprise in the world of literature was about to lose its last glimmer of life, as it was called in the language of the present time, 'the author of the late Poems, appears to have deserted the world forever.' But the world recognized its mistake, and while Wordsworth's name was recognized as one of the greatest poets in the English language. It was followed by 'The White Doe of Rhyllstone'; this in 1819: 'Peter Bell,' dedicated to Southey, and which, though not very successful, fitted very finely into the poetic scheme which was more immediately popular; this, very shortly, by 'The Waggoner,' dedicated to Charles Lamb, and 'Sonnets 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 stanzas in favour of the poems) a new and most important poem, in subsequent editions; and in 1835, he published and dedicated to Rogers 'Yarrow Revisited, and other Poems,' the result chiefly of his recent Scottish tour. Other collections of poems in the same vein, either before or after 1828, were repeatedly penned and subsequently published; and in 1847 he published a collected edition of his poems in six volumes, re-arranging them in a new order on a peculiarity of his own, and with the whole as to the true nature of poetic subjects, and the true nature of poetic diction, Wordsworth was very severe in his criticism of the poets of the 18th century. Very few of them, he said, had looked at nature for themselves, satisfied with repeating the verse and over again images in any a new, 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 lying artificial diction 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, the so-called poetic diction, in which words were distrusted 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 reply was not very simple, or neglected or severely criticised. In the interest of his views 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 manly and thoughtful class in society; but the critical disapprobation of what he had already published, partly of the appearance of other poets, thrown out at intervals from his retreat among the Lakes, each making a national sensation and some revealing the poet's voice, gave occasion to many of Wordsworth's friends and admirers to harass most on 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—his last tour in 1814, of a more continental tour in 1830, a tour in Holland and Belgium in 1832, in North Wales in 1834, on the Rhine in 1838, in Ireland in 1839, in Scotland again in 1833, in Italy in 1837, &c. Before his removal to Rydal Mount, his children Catharine and Dorothy Wordsworth were the two girls who were his inanimate. His poems were as yet no source of income to him; but just at the time of his removal to Rydal Mount, he was
and brother of Princess Dashkow. Semen Woronzow was for many years Russian ambassador to England, where he was first sent by the influence of Prince Potemkin, in 1760, and where he remained in that capacity till 1766, 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 1822, at the age of eighty-nine. His son, the Earl of Pembroke, married the late Earl of Pembroke, and was mother of the Right Hon. Sidney Herbert. Mikhail Woronzow, living in England to the age of sixteen, was as familiar with the English language and manners as many of his contemporaries with the French. He was born in the country, and the country of his education certainly had no cause to blush for its pupil. At the age of nineteen he entered the Russian army, in which he fought under Kutuzov against the Turkish, and took part in all the great campaigns against Napoleon I. He commanded a division at the battle of Borodino, where he was severely wounded, and he led the Russian cavalry at the battle of Leipzig. It is said that on a subsequent occasion, in 1814, his conduct was elicited from Napoléon himself: "That is the stuff of which marshals are made." Several interesting notices of his opinions and conversation at the time of the occupation of Paris by the allies after Waterloo, are to be found in the diaries of his friend, Sir John Malcolm, printed in the "Memoirs of a Life," and these show that he was indeed the Russian contingent in France from 1816 to 1818, and is said to have paid an enormous sum from his private purse to avoid the disgrace of leaving the debts of Russian officers unpaid when they evacuated the country. In 1822, after his retirement from the service and residence in London, he returned to Russia and Bessarabia, a post which he held for many years, only quitting it for a short time in 1828, to take the command of the Russian army after Menshikow had been wounded at the siege of Silistria. This division was added in 1844, that of the Caucasian Provinces, with an authority superior to that of any preceding governor, Woronzow being made dependent on the Czar alone. He adopted as far as possible a policy of conciliation to the native tribes, which impressed Charles Townshend, the British minister, as to capture in 1845 the stronghold of Shamy, the town of Dargo. The bravery and obstinacy of the mountain people rendered his military successes in Circassia of no permanent value, but he succeeded in introducing great improvements into the other countries under his government, building towns, making roads, promoting the cultivation of the vine, and settling in general an example of disinterestedness and high feeling. He always continued partial to the land of his youth, where he was fond of receiving Englishmen, and his countrymen—indeed, the whole of his country after the imperial residence of Orianda, was built from the designs of an English architect, Mr. Papworth. He is understood to have been averse to the Russian war with England. During his time in France on the Turkish question, in which, by a somewhat similar combination of circumstances, his nephew was the English secretary at war. During the early progress of it he was kept by ill-health at Tiflis, and in March 1854 he obtained a six-months' leave of absence, which he spent at Karalad and Schlangenbad, but with so little benefit, that in October of the same year he solicited and obtained permission to retire. He died on November 18th 1856 at Odessa, leaving behind him a high reputation among both natives and foreigners for probity and independence.

WYATT, RICHARD J. An eminent sculptor, was born in Oxford-street, London, on the 3rd of May 1770. Having chosen sculpture as his profession, he was placed as a pupil with Charles Rossi, R.A.; and about the same time he entered the Royal Academy as a student. During the seven years which he served with Rossi, he twice carried off medals at the Academy, the first time in the studio of Nacar, where his Augustan figure of Bocio at Paris, and who kindly invited him to Rome, and offered him advice and assistance in the prosecution of his studies. In the fall of Caravaggio he was a fellow-student, and the friendship here formed between 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, till the death of the great Italian master. Wyatt went to Rome in 1819, 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 unassuming 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 productions is enormous; and not only are they of the highest merit. He was greatest in poetic and classic subjects, in which he displayed a fertility and grace of invention, a singular elegance of thought, and a degree of finish beyond most of his contemporaries. He was undoubtedly one of the noblest of the sculptors of our time. His busts of Barba and specially his female figures, are beautifully modelled, always posed with grace and animation, and always present pleasing forms from whatever side they are viewed. His figures too are live to all who see them; he expresses textures truly, yet without lack of sculpture or plasticity. 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, that was executed for Lord Charles Townshend, was called "Nymph leaving the Bath"—herd with a Kid; 'Shepherd Boy; 'Glycera; 'Musidore; 'Bacchus; 'Penelope,—an exquisite statue executed for her Majesty; and his admirable groups of the "Nymph Euchaeras and Cupid; "Iaso and Bacchus; "Nymph of Diana taking a thorn from a greyhound's foot; "A Huntress with a Leveret and Greyhound"—his last work. He also produced many excellent portrait busts, some relié, and monumental sculpture. At the Great Exhibition of 1851, several of his works were exhibited, and the medal for sculpture was awarded to him. He was a member of the Royal Academy, a bye-law of that institution rendering artists ineligible unless resident in England. Casts from several of Wyatt's works— including most of those named above—are kept in the Crystal Palace at Sydenham. WYCH-ELM. [Uxbridge.] 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 embossed with a design of the assassination of Julius Cæsar, which was presented by the city of London to Wilkes. His father, Peter Wyon, to whom, in 1768, he was apprenticed, was a dealer 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 of the Venus of Milo, which were modelled at 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. As there is a figure of Antinous, which so delighted his father, that he had 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. In 1820, he married Thomas Wyon, a woman of the highest character. After some time he cut the head of George III. His prospects were now most favourable, and his position altogether agreeable to him—for the chief engraver, Thomas Wyon, was his friend and cousin.
But unexpectedly the latter died, and Mr. Pistrucchi was nominated in his place. The new engraver and his chief assistant could not agree. Pistrucchi, a skilful artist, is said to have been indolent, and while serving to himself the greatest part of the honour and emolument, to have left the greater amount of labour to Wynn. Under a new Master of the Mint these differences were compromised by an arrangement, which left Pistrucchi nominally chief engraver until his death, but gave half his salary to Wynn. With this Wynn no longer on the literary wars that arose out of 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 Wynn's own merits, by electing him in 1833, an Associate, and in 1836 an Academician, the first of his department who had ever obtained these honours.

Wynn's works may be divided into coins and pattern pieces of coins, medals, and seals. His coins include some of the later years of the reign of George IV., all those of William IV., and all those of his present Majesty which appeared in Wynn'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 artist who struck them at this time, under the title of moneyers, 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 Wynn's disappointment or the intentions of his countrymen. In consequence of this neglect, many of these pieces, 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, Geological, 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; and testimonial, as in the case of the Bromley medal, which bore a head of the queen, whose honour it was in the accompanying circumstances. Thus, Cicerò adorned the Peel-Harrow medal, while heads of Lord Bacon, Sir Isaac Newton, Dr. Wollaston, and Sir Francis Chantrey, were respectively and appropriately connected with the medals of the Royal Institute, 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 Wynn was indebted to Flaxman, for whom he had an enthusiastic veneration, Howard, and Stothard, who contributed the reverse to a medal of Sir Walter Scott. Wynn'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 Wynn are the combination of two (often opposing) qualities, strength and delicacy, with the indispensable merit of likeness in his portraitures; 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. Wynn was born at Brighton, October 29, 1851, in his fifty-seventh year, leaving 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 frequent contributions to the Royal Institute's Great Exhibition; and is thus gratefully 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.

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, and was not only the first shot, but the first angler of his day. The accurate habit indicated 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 belonged to the interesting subject of ornithology and British birds. He 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 Linnean 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 Linnean Society, and the various Journals devoted to natural history literature. His earlier 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 hornied appendage to the upper 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 Crossbill' (Ibid., IV.). He was one of the most intimate members of the society, and contributed many papers to the Proceedings of the Committee of that body. 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 dissections are very numerous, 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 Bait, 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 day. He had a particular love for the study of 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 Penguins of Dr. Latham'; 'On the Trochæa of the Cuculliferae'; 'On the Natural History of the Great White Shark'; 'On the Natural History of the peculiar Birds of the California Islands.' In 1843 he wrote a paper on the natural history of the Great White Shark, which, he said, had been killed by the fishermen of his native port of Lowestoft, and on the same day that it appeared in the society's journal, it was declared it had been killed by the great shark which previously to this appeared at the same place. Yarrell's papers on 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 respect 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, but a third was not forthcoming. 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 its publisher Mr. Van Voorst. No work on this subject since the time of Bewick's 'Birds' has been so popular. In many of his details, especially his picturesque tail-pieces, he imitated his great predecessor, but in point of accuracy of description and the homely
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truthfulness of his account of the habits of birds Mr. Mr. Yarrell had no equal. At the time of his death Mr. Yarrell was treasurer of the Linnaean 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 a Fellow of the Linnean Society, and when he died, no one, except his late wife, knew of his death. During the greater part of his life, the Royal Society would have gladly admitted him amongst its fellows, and his certificate was presented to him. In August 1856 he was attacked with paralysis, but although he sufficiently recovered to make a voyage to Yarmouth, he was seized with another fit on the evening of his arrival, and died on the morning of the first of September 1856. He was interred at Bayford in Hertfordshire.

YEAST, a substance found on the surface of fermenting liquids, 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 immersed 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 fungous character, and they have been called the yeasts. Yeasts have large vacuoles, and these vacuoles 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 that the other saccharomyces degrees are probably a pseudomorph of this process, being regarded as the result of the growth of the plant. This seems to be a misinterpretation of the phenomena, as the plant is probably the result of the carbo-nic acid given off during the process of fermentation rather than from the fermentation. Yeast-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 yeast has been enlivened by the discoveries of double organisms in their development, as well as the phenomena of fermentation in general, requires further elucidation.

(Schleiden, Principles of Scientific Botany; Microscopic Dictionary, articles 'Fermentation,' 'Torula,' 'Yeast.')

YELLOW COPPER ORE. [MINERALOGY, S. J.]

YOUNG, THOMAS, M.D., was born June 13, 1773, at Milverton, in Somersetshire. He was the eldest of ten children of Thomas and Sarah Young, who were both Quakers. In 1780 he was placed at a boarding-school at Stapleford, 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 the classical languages, Oriental languages, and the modern languages. After his return home 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 an usher at 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 Youngsburry, 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 languages, algebra, fluxions, natural philosophy, and the 'Principia' and 'Optics' of Newton. Mr. Hodgkin in 1793 published 'Calligraphy Graeca,' which he dedicated to Young, who had suggested to him the study of that useful art. In 1794 he published 'A Course of Lectures on Natural Philosophy and Mechanism,' which was most advantageously received, and other memoirs, and a classified catalogue of scientific 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,' 5vo. 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 and practical parts. One of these is the principle of interferences in the undulatory theory of light. 'This discovery alone,' says Sir John Herschel, 'would have sufficed to have placed its author in the highest rank of scientific immortality, even were his other almost innumerable able claims on such a dignified and important recognition, however, of Dr. Young's investigations on light 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 manuscript copy was extant. This question was treated in the French philosopher Fresnel, who entertained views similar to his own on the nature of light. The undulatory theory is now generally received in place of the molecular or eamatory theory. Among the other difficult matters of investigation in which Dr. Young engaged was the decipherment of the Egyptian Hieroglyphics, in which he was superiorly equipped.
of the physicians of St. George's Hospital, a situation which he retained for the remainder of his life. His practice there was not very successful, but he never became popular. In 1813 he published 'An Introduction to Medical Literature, including a System of Practical Nosology, intended as a Guide to Students and an Assistant to Practitioners,' 8vo. In 1816 Dr. Young was appointed secretary to a commission for ascertaining the lengthening of the seconds' pendulum, for comparing the French and English standards with each other, and for establishing in the British empire a more uniform system of weights and measures. Early in 1817, reports, 1819, 1820, 1821. In 1818 Dr. Young 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 successive 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 Encyclopædia 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 returned to England, in June 1828, became a member of the Academy of Sciences at Paris, in place of Volta, who died in 1826. Dr. Young died May 10, 1829, and was buried in the vault of his wife's family at Farnborough, Kent.

In 1835 was published 'The Life of Thomas Young, M.D., F.R.S., &c. by George Peacock, D.D., F.R.S., &c., Dean of Ely, 8vo.' In the same year was published 'Miscellaneous Works of the late Thomas Young, M.D., F.R.S., &c., vol. 1. and 2. containing his Miscellaneous Memoirs and Correspondence,' 8vo, &c., edited by John Leitch. These volumes contain all Dr. Young's contributions to the 'Transactions' of the Royal Society; the principal articles furnished for the 'Quarterly Review,' an essay from Nicholson's 'Journal' and Brande's 'Journal,' some reviews on scientific subjects from the 'Quarterly Review,' and several essays either separately published or dispersed in different publications.

ZAGOSKIN, MIKHAIL NIKOLAEVICH, a Russian dramatist and novelist, was descended from a Tartar family, and was born on the 14th of July (o.s.) 1789, at the village of Ramaz, 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 was early reared up to the study of his literary tastes, reading all he could obtain, and composing 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 an officer in the St. Petersburg Opoljenie or Militia, took part in the campaign against the French, was wounded at the battle of Poltzak, and before the close of the war rose to beadjutant 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 reviving, and not long after he had taken leave of a military life—he sent anonymously a comedy, called 'Prokaznik' or 'The Wag,' to Prince Shakhovsky [Shakhovskoy, S. 2], director of the St. Petersburg theatre, who had himself just returned from the duties of a regiment of Cossacks. The reply was so unexpectedly favourable, that Zagoskin at once made himself known, and Shakhovsky even procured for him a post connected with the theatre, and opened for him a literary library, where we are told that for his services in assisting to arrange the books and to catalogue the Russian ones, 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 of them was 'Mr. Geronimo,' or the Country Gentleman in the Metropolis;' 'Bojetonov 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 being singularly insensible to cadence and metre, 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 give them an example; and after all, setting doggedly to work, and making progress at the rate of four lines a day, correcting the metre 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 detested the composition; and when he determined to write a drama in imitation of Walter Scott, one chief inducement was to enjoy a double freedom from the trammels of rhyme and

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the rules of the drama. The tale he produced, 'Yuri Milolavsky ili Rusci v 1612 Godu' [George Milolavsky, or the Russians in 1612], 3 vols., Moscow, 1829, delineates 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 in his biography, "opened a new epoch in the literature and social career of Zagoskin. The enthusiasm was universal 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, were all taken into a rapturous迷狂的 comments; the 'Yuri Milolavsky' 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 1854, 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 in 1820 by a Russian lady of high rank and her 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 alterations were not approved by the Impeators, their aim was, in their Russian life and character, stamped by native approbation 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 'George Milolavsky' 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, as 500 copies were printed, and an enormous price given 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 diminishing, and some of his best were considered to rival 'Yuri Milolavsky,' or even 'Rostavlev.' He continued to reside at Moscow, where he enjoyed the additional appointment of director of the library of the Kroukhevi, and was one of the most 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 Moskvichi' [Moscow and the Moscowians], which ran to three or four volumes. After a tedious illness, originating in gout, which he combated by homoeopathy, he suddenly expired at Moscow on the 23rd of June (o.s.)
1882. Soon after his death a life of him by Aksakov appeared in the 'Moskvitianin,' from which the following 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 everything he did. His military experiences and the perilous undertakings during 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 hydrographic and administrative affairs. Professor Schumacher in the measurement of the Danes are 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 successive Admiral Lovenørn as director of the Hydrographic Office at Copenhagen. In this capacity, notwithstanding much prejudice respecting the publication of documents, he brought the labours of his department in an available manner to the world, and with the highest degree of finish and exactness. The works so important to the navigators of all nations, on which his fame rests, are the charts of the coast of Denmark, with accurate soundings between the numerous islands, accompanying charts on the coast of the islands and the principal metrical surveys of the coast. His chart of the North Sea (1843) was indeed the greatest boon to all seamen, and to those of Britain in particular; whilst the 'Danake Lode' (Danish Pilot), which is a complete description of all the seas around Denmark, is best in its kind so far as known, 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 Denmark, chief of the steamers, head of the coast and Copenhagen, and a chamberlain of his sovereign, as well as a knight grand-croix of the order of Dannebrog and Dannebrogman, and a knight of four foreign orders, Russian, Prussian, French, and Greek.

A diploma Sahmsenes died suddenly on the 15th of April, 1853, in the sixtieth year of his age. The estimation in which he was held by his countrymen was evinced by the attendance at his funeral of the princes of the royal family, the ministers of state, the corps diplomatic, and many officers of the army, navy, and civil administration.

He was an honorary member of the Royal Geographical Society of London, and communicated to that Society, in 1830, shortly after its foundation, an account of Danish discoveries and expeditions in the Eastern seas, in which he had been engaged in the service of his country. This year: a translation of his official report on which, sent to the Geographical Society of Paris, appears in the first volume of the Journal of the former Society. In the same work, vol. v., is an elaborate paper by him entitled 'Remarks on the Voyages to the Northern Hemisphere, ascribed to the Zeni of Venice;' in which, communicated to the society in 1836, he arrives at the conclusion that these voyages, at least in the main points, are mere fabrications.

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1849. The New Zealand Mail steamer, the 'Leven,' after a voyage of 10,000 miles, arrived at the port of Wellington on the 18th of February, having arrived from Sydney on the 15th of February. The New Zealander, the New Ulster, 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 pieces of the natives. This island is generally called New Zealand. The name New Ulster, 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., 166° and 178° 36' E. long. The two large islands are about 3,000 miles, and the entire length of the two is about 1,000 miles. The width varies from a few miles to 250 miles. Stewart Island is about 60 miles in length and 60 miles in width. They are about 1,200 miles eastward from the New Zealander, the New Ulster, the New Zealand Mail steamer, the 'Leven,' after a voyage of 10,000 miles, arrived at the port of Wellington on the 18th of February, having arrived from Sydney on the 15th of February. The New Zealander, the New Ulster, 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 pieces of the natives. This island is generally called New Zealand. The name New Ulster, 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., 166° and 178° 36' E. long. The two large islands are about 3,000 miles, and the entire length of the two is about 1,000 miles. The width varies from a few miles to 250 miles. Stewart Island is about 60 miles in length and 60 miles in width. They are about 1,200 miles eastward from the New Zealand Mail steamer, the 'Leven,' after a voyage of 10,000 miles, arrived at the port of Wellington on the 18th of February, having arrived from Sydney on the 15th of February. The New Zealander, the New Ulster, 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 pieces of the natives. This island is generally called New Zealand. The name New Ulster, 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., 166° and 178° 36' E. long. The two large islands are about 3,000 miles, and the entire length of the two is about 1,000 miles. The width varies from a few miles to 250 miles. Stewart Island is about 60 miles in length and 60
human houses. The towns in the house are mostly of wood. The town of ZEA is a part of the island where the soil is especially fertile, and it has an 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 harbors north of Auckland, and a great number of 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 9 miles in breadth. In 1851 there were 14 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 town councillors. The town and its environs were St. Paul's church, a handsome building; two sets of barracks built of siorie; a public hospital; a market-house; a native hostelry; public washing, bathing, and drying grounds; several chapels; and a bank. There also several bridges, wharves, and landing-places. The governor's residence and the bishop's are closely adjacent, and 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 the town in 1861 was about 4000; in the district in 1861 there were 8840, of whom 4921 were males, and 3919 females. The flag-staff of the barracks is 31' 51" 27' 8". The Wellington, the principal settlement of the New Zealand Company, founded in 1840, is on the shores of Port Nicholson, 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 in 41° 47' 27' E. and 174° 47' 7" S. The town is surrounded by mountains, except at the alluvial tract through which the river Hutt, or Erington, reaches the sea. These mountains rise abruptly from the water's edge, except in the most southern corner of the harbour, where there is a strip of flat land extends at their base, about one-third of 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 semi-circle 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, they have been planted partly for wood, and partly for pasture, and thus the most distant points of the town are nearly four miles from the harbour. In 1848 there were 525 houses, of which 45 were of brick or stone, 303 of wood, and 177 of clay and wood, or other materials. Other houses are of cylindrical shape, covered with corrugated iron, since the winds of gales 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, a Wesleyan chapel, 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 38 schools of various kinds. Most of the public buildings are of wood only. The population of the district in 1861 was 5727, of whom 3153 were males and 2587 females. The town is well supplied with water by streams which run north into the bay, and there are deep wells, which supply 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 miles from the town three churches have been consecrated, and the buildings have been well conducted. In 1856, the vessels registered at Auckland, or belonging to it, consisted of 3 steamers, 41 foreign-going vessels (6918 tons total burthen), 75 coasters belonging to English owners, 49 coasters belonging to native owners, and 188 small craft averaging 10 tons, of which 34 belonged to native owners, being unnumbered. The coast in 10 to 70 feet in front of the town. Auckland, named after the famous city in Great Britain, was founded in 1840, by the French, who had attempted to land in the Bay of Islands, but were prevented by Governor Hobson; and under his direction, and accompanied by an English magistrate under the British flag, they settled at Akaroa. Akaroa is near the south-east coast of Banks Peninsula in New Munster, in 43° 62' 6".lat., 173° E. The Harbour is an inlet 7 miles in depth, with steep shores, and has a bar at the entrance, but it is perfectly landlocked within. Thelli this HARVEST, the hills are cultivated, and it, and there is 14 fathoms water inside the harbour. The town contains a church, the residence of the magistrate, a jail, and the cottages of the inhabitants, who are chiefly agriculturists. Bay of Islands, at the northern end and east coast of New Zealand, is the seat of an important whaling station, and was first settled by Governor Hobson for the site of the capital, but was abandoned in favour of Auckland. Two towns however sprung up, Russell and Kerikeri; the first on the north side, and inhabitants expelled by Hekia, and from the other they withdrew to Auckland. Still some Europeans have kept their position here, and the government returns state the population as 400. Canterbury is the name of a settlement on the bank of the Rakaia river, to the north-west of Christchurch, according to the principles of England, and with a large ecclesiastical establishment. It comprises the whole of Banks Peninsula, and a large district running back westward to the range of mountains, and extending along the eastern coast for many miles, and the population in 1850 was estimated in the government returns at 1600; but Mr. Fox, in his "Six Colonies of New Zealand" (1822), gives the number at 3374; and two towns had been formed, Lyttelton, at Port Victoria, and Christchurch, on the eastern side of Lyttelton Harbour. Christchurch College and schools founded. Kaitaia is a native village, and a missionary settlement in New Ulster, in the valley of the Awanui, a few miles S.W. from Doubtless Bay, and about 40 miles from the coast, towards the north-east of New Ulster. Motuwaka is a native village, with a slight admixture of Europeans, about 50 miles S.E. from Nelson. In this village, of which the population is about 1400, agriculturist seems to be the principal occupation. The island of Queen Charlotte Sound in Cook Strait. Nelson, situated on Nelson Harbour, in Blind Bay, New Munster, on the southern side of Cook Strait, in 41° 16' S. lat., 173° 16' W. long., was the second settlement of the New Zealand Company, and was made in 1843. The port is a good one, but the district is chiefly agricultural. The population of the whole district, which is extensive, amounted in 1851 to 4287, of whom 2317 were males, and 1970 females. There are in the town one church, one Wesleyan chapel, two other chapels for Dissenters, and one Roman Catholic chapel. There are three other churches and six chapels at various villages. We have noticed the great extent of sheep farming in this district, and as the pastures lie wide it has led the people to export wool. Three miles from the town, 18 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 Waiaki lead to a total of 1000 tons per month. Copper is also found near the Mount Dun, about 8 miles from Nelson. In New Ulster, situated between two small streams, the Huatoki and the Henui, 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
beridae. The Boar-Fish of English writers is referred by Jenyns and others to this genus, but Cuvier, Lacépède, and Yarrell, refer it to Cephalopods. The Boar-Fish is a species of nocturnal Lepidoptera. 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.

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distinction by proficiency in study, at the village of Mishenskoye, 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 churchyard of Mishenskoye that the first translation of Gray's '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. Bowering, in his biography of Gray, tells us that the translation of 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 Moscow and the Muscovite, the foundation of a fame which extended itself far beyond the limits of its creator. In 1807, it first appeared in the 'Viestnik Evropy,' or European Intelligencer, thus 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 Karamzin and Dmitriev, and a 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, and he soon relinquished the employment, though he continued himself a contributor there.

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 Rostop- chin, whose services, however, it was not intended, to his ranks of 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 he was most distinguished:

"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 among the ranks of the army. However, he became accustomed to the fatigues of a military life, was attacked 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 in the Russian Camp." He was invited to the court, and the issue of a poetical epistle 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 4000 rubles. For some years afterwards his time was divided between Moscow at St. Petersburg.

He was of the family 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.

His most popular productions in this his most productive period are the poems of ballads, which he was the first to introduce into Russian literature. His first poem of the class, "Zlumilki," an imitation of Bürger's 'Lenore,' startled the Russian public into a belief that he had a talent for the poetry of romance, and he treated the same subject with variations in a poem entitled 'Svetilana,' 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 constitute what some of the Russian critics are fond of calling the "inimitable imitations" of Zhukovsky. But how far the imitation extends it is not always easy to ascertain, for in most cases he takes the liberty of suppressing the name of the original."
Two children, both boys, were the sons of the mariner, and his chief delight was in superintending their education, which he wished that 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 1832, Zhukovsky had died 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 1833-37, fills eight octavo volumes, and is used as a common material for packing, and for stuffing cottager's cushions; it has also been used medicinally as a poultice.

ZOGA, River. (Aravia, S. 2.)

ZSCHOKKE, JOHANN HEINRICH DANIEL was born at Magdeburg in Prussia on March 22, 1771, and received the earlier part of his education in the Klosterschule and in the gymnasium of that town. When only seventeen he quitted his school and family, and became play-writer and troop of strolling-players. In a short time however he returned to his family, 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 life as a writer, while in the free state of Prussia he employed most of his time in writing for the stage, where his 'Aballino, the Bandit' (of which the story was borrowed by Monk Lewis for his 'Bravo of Venice'), and 'Julius von Sassen', produced at this period, were favourably received. Zhukovsky's works were all in favour of the principle of the humanity of respect for religion, and therefore when, in 1796, he applied for a professorship it was refused him. He then left Frankfurt, travelled about Germany and France, and at length settled at Reichenau in the Graubunden, where, in conjunction with Zellweger, he established a boarding-school for boys, which was so well conducted that the canton presented him with its freedom as a burgher, and he voiced his gratitude by writing his 'Geschichte der Freistaaten der drei Bünde in Rheinland' (History of the Free States of the Three Bünde in the Rhine). This work appeared in 1799. 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 established by 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 Aarburg, where he published a journal called 'Zur Alp', and the Helvetic republic was then fixed. His reputation, his 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 accredited commissioner to carry on the emancipation of Unterwalden, suffering from the devastations of a 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 'Historische Denkwiirdigkeit der Schweizerische Staatsenwaltung' (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 labours of aid and humanity. An excellent sketch, published in 1801. In 1801 the central government of the new nation appointed him to the 'Geschichte vom Kämpfe und Untergange der Schweizerische Berg- und Wald-cantone' (History of the Conflicts and Fall of the Swiss Mountain and Forest Cantons), an excellent sketch, published in 1801. In 1801 the central government of the new nation appointed him to the "Geschichte vom Kampfe und Untergange der Schweizerische Berg- und Wald-Cantone" (History of the Conflicts and Fall of the Swiss Mountain and Forest Cantons), an excellent sketch, published in 1801. 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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 Land-mann, Almighty God, became aware of his popularity, 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 1814, when the Swiss after the downfall of Bonaparte, again wished to reconstruct their constitution, Zschokke exerted himself to maintain peace in Aargau, while he strenuously defended its independence against the claims of Bern. In 1820, in consequence of some imputations against him as editor of the ‘Schweizerboten,’ he resigned his office of church and forest inspector, but retained those of member of the council, of the school directory, and president of the directory of the school of education for artisans. In 1830 he was re-elected 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 distinguished by a lucidity of arrangement, clearness of perception, a keen insight into character, and warmth and strength of expression; his novels and tales of mediocrity or other classes in number. Among the best are his ‘Adventures of a New Year’s Night,’ which was translated into ‘Blackwood’s Magazine,’ ‘Jonathan Fröck,’ 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 Branntweinpest’ (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 Alpenwander.’ 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 meditative 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 novel to be his till the appearance of his ‘Selbsethah,’ 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 14 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 ‘Goldenthal,’ a tale; ‘Der Goldmachers dorf;’ ‘Love’s Stratagem,’ and other tales; ‘The History of Switzerland;’ a volume of select essays; and the ‘Stunden der Andacht,’ under the title of ‘Hours of Meditation and Reflection.’